the OIL AND GAS JOURNAL

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PRICE 50 CENTS TABLE OF CONTENTS ON PAGE 5 NOVEMBER 10, 1952

WHAT MAKES A TRADEMARK GREAT?
The "Flying H" has flown wherever free men drill for oil. But an adopted symbol of identification has no honor in itself. Greatness comes when the company it marks has earned a place of high esteem.
For over a quarter century, on more than a million jobs, Halliburton has strenuously strived to give the highest quality service. When the "Flying H" is looked upon as a symbol of service, the men of Halliburton will have earned a cherished honor.
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OIL WELL CEMENTING CO.
DUNCAN, OKLAHOMA

THE OIL AND GAS

JOURNAL

Vol. 51, No. 27

NEXT WEEK

- Annual A.P.I. Issue. Featured will be a 16-page symposium on Evaporation Loss of Petroleum from Storage Tanks, prepared by subcommittees of the A.P.I. Division of Marketing for preparation at the annual A.P.I. meeting in Chicago. Included are a number of tables of data, correlating equations, and seven new nomographs for calculations necessary to determine evaporation losses.
- Also presented both in the news and engineering sections will be a large number of other papers and complete coverage of the meeting by members of the Journal staff.

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We have a talent for accomplishing unusual services demanding fluid policy, stability and understanding of our customer's problems that has aided substantially in the emergencies with which the Oil Industry has found itself confronted during the past several years.

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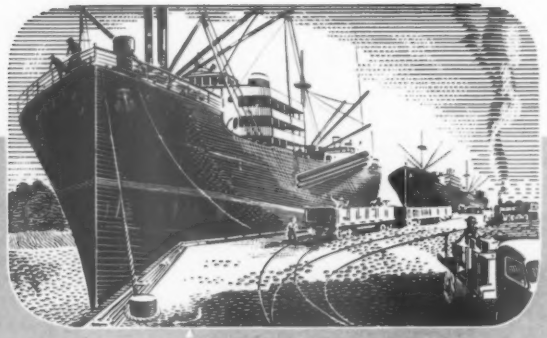

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with your present furnace and stack

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Coppus-Dennis **FANMIX** Burners give you *perfect* mechanical mixing of fuel and air *at the burner outlet . . . instantaneous* ignition close to the burner . . . and *complete* combustion *without visible flame* when burning natural gas. No other burner combines these three advantages.

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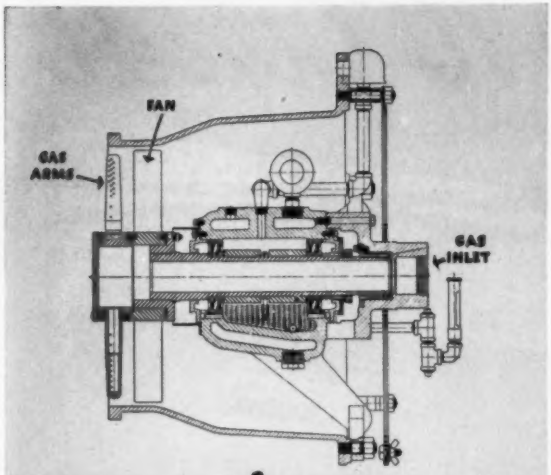
When you see in Bulletin 410–6 how fuel escaping from orifices in rotating driver arms rotates the fan to draw the correct proportion of air into the path of the fuel at right angles . . . how **FANMIX** creates its own forced draft, reduces stack requirements, prevents cracking of "wet" gas . . . how two **FANMIX** types handle either gas or oil or any combination of both — you'll understand why **FANMIX** Burners have such wide acceptance in oil refineries and power plants.

Send for the Coppus-Dennis **FANMIX** Bulletin 410–6. Coppus Engineering Corporation, Worcester 2, Mass. Sales Offices in THOMAS' REGISTER. Other Coppus "Blue Ribbon" products in BEST'S SAFETY DIRECTORY, CHEMICAL ENGINEERING CATALOG, and REFINERY CATALOG.



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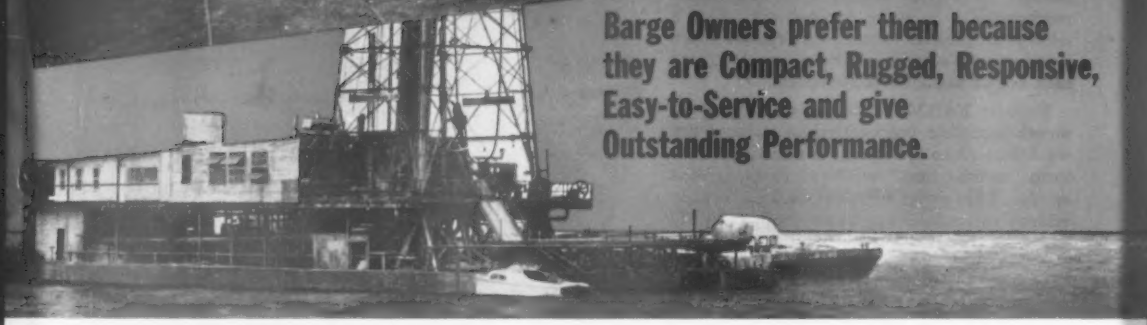
10 "Oilwell" No. 96 Rigs

—now doing off-shore work along the Gulf Coast



Barge Owners prefer them because they are Compact, Rugged, Responsive, Easy-to-Service and give Outstanding Performance.

"OILWELL'S" No. 96 RIG is fully air-controlled and embodies the latest developments in semi-automatic operation. It has a compact control panel with a bank of easy-to-read dials which show oil and air pressures, water pressure to brake, engine speed and power loads. This panel also provides the driller with fingertip operations of catheads, clutches, etc.

Both the Draw Works and Drive are so designed that all working assemblies are protected, yet are readily accessible for servicing and maintenance. When maintenance adjustments become necessary, major assemblies can be removed as a unit and serviced quickly right on the barge. This construction also permits the operator to replace assemblies when major overhauls become advisable, with minimum loss of drilling time.

GET ALL THE FACTS . . . and you, too, will select an "Oilwell" No. 96 Rig with Companion Equipment . . . including Slush Pumps, Rotaries, Swivels, Blocks, and Wire Lines . . . for all drilling operations below 10,000 feet. Your local "Oilwell" Representative will welcome your inquiries.

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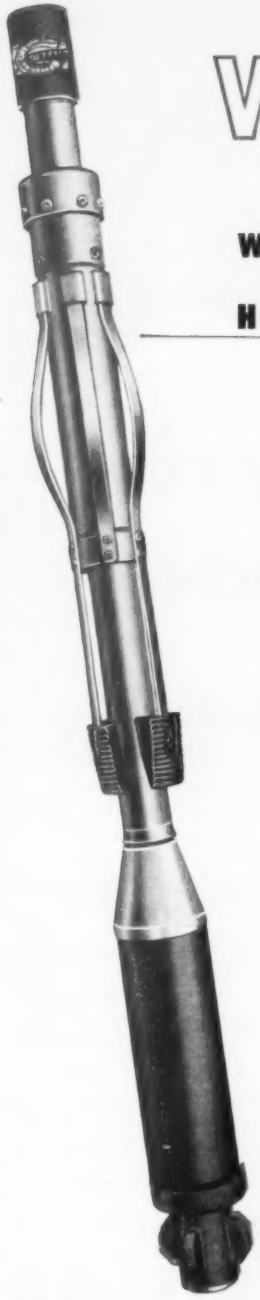
WATERFLOOD

WITH GUIBERSON'S *type* 'WF'

HOLD DOWN PACKER WITH AUTOMATIC LATCH



Type "WF" Hold Down Packer with Automatic Latch

The Type "WF" hold down packer is a low cost tension packer designed especially for water-flooding, salt water disposal and similar projects. It may also be used for injecting fluids under moderate pressures into the formation below the packer and for other operations requiring tubing pressure in excess of pressure in the annulus.

The packing element on the "WF" is a long sleeve type with sixteen inches of exposed soft rubber that will effectively seal even a rough and pitted casing wall. It will not vulcanize to the casing. Design and construction is such that the same packer will pack-off in a wide range of casing weights; an advantage which, coupled with low initial cost, makes this packer an exceedingly economical investment.

The "WF" has the easy-run, easy-set, easy-pull characteristics of all Guiberson packers. Ample fluid by-pass eliminates down swabbing and assures easy run-in without the use of a valve. Friction springs provide necessary back-ups for the latch mechanism which features an all-metal latching dog with corrosion-resistant coil springs. An anti-lock device assures dependable latch release. Downward movement of tubing in relatch operation automatically latches slips out of engagement with head, freeing packer immediately for removal or resetting. For positive pack-off at lowest cost, use the "WF" in any recommended application.

THE

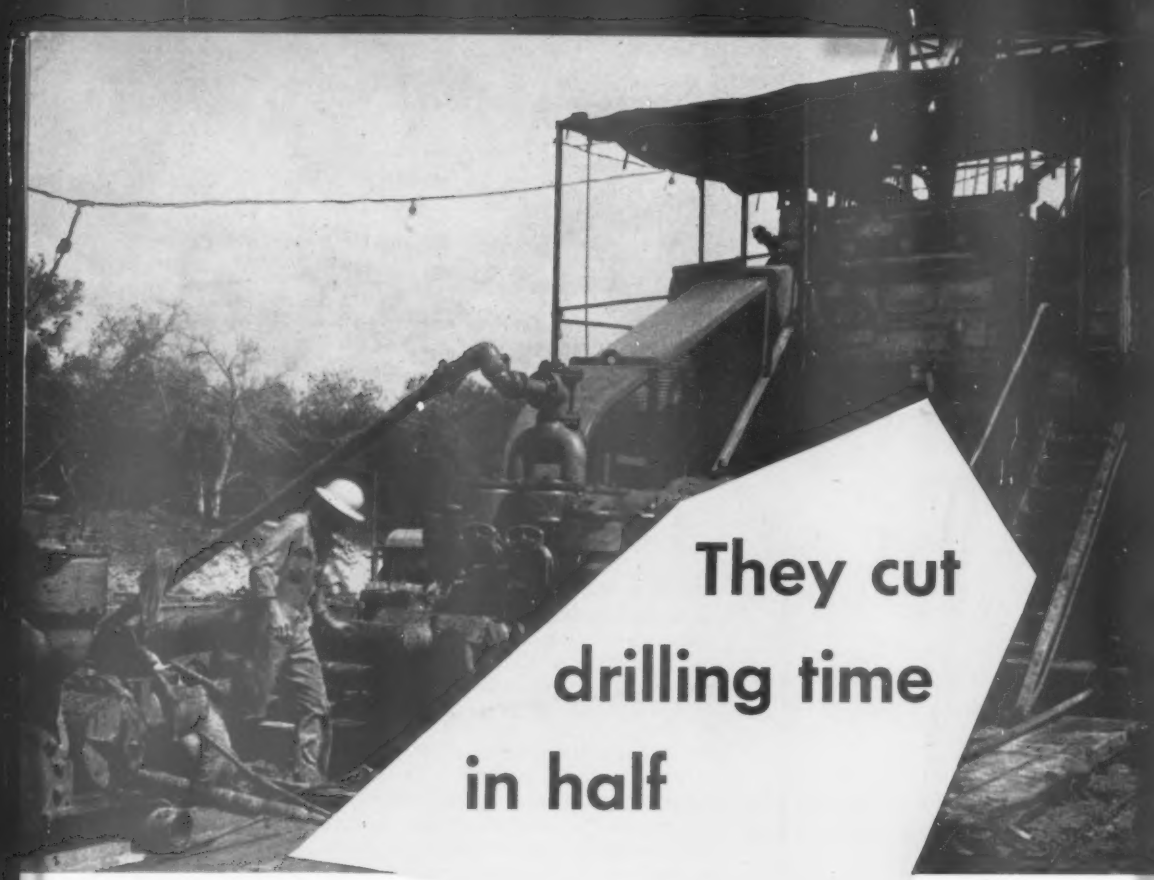
GUIBERSON

CORPORATION

ESTABLISHED 1919 • DALLAS, TEXAS, U. S. A.

Sold By Leading Oil Field Supply Stores Everywhere

The Oil and Gas Journal, published Mondays, copyright 1952 by The Petroleum Publishing Company. Entered as second-class matter September 1, 1910, at post office at Tulsa, Okla., under act of March 3, 1879. U. S. and foreign rates to the petroleum industry, $4 yearly.



They cut drilling time in half

Newman Brothers Drilling Company, San Antonio, Texas, had good reason for investing in these two big "Caterpillar" Oilfield Engines. Let's hear about it from William C. and John E., in their own words: "When 'Cat' writes its name on an engine, you can bet it's the best. We know. Before we got our D386s, we had two D13000s working constantly for us since 1940 – about 12 years. We'd refer to the power they deliver as 'dray' horsepower – not 'little colt' horsepower. We've had no trouble with our D386s since we bought them. They're great!"

The two D386s are compounded to drive a Gardner-Denver mud pump and Brewster draw works on an oil lease in McMullen County, 150 miles south of San Antonio. According to Newman's tool pusher on the job, they're drilling between 7,000 and 10,000 foot holes in just half the time formerly averaged with engines of another make. The two "Cat" D13000s, incidentally, were rebuilt after more than 40,000 hours of service, and are now back on their rig.

Performance like this is typical of "Caterpillar" Oilfield Engines. They're built for long life with a minimum of down-time – and they're true to their rating. They deliver the horsepower as advertised. For fast round trips, you can count on "Cat" Diesels to come through with all the power promised!

Compact oilfield engines are available in 12 honestly rated sizes, to 500 HP. Ask your reliable "Caterpillar" Dealer about their performance in the field. He's nearby, with genuine parts and complete service facilities at your disposal!

CATERPILLAR, PEORIA, ILLINOIS

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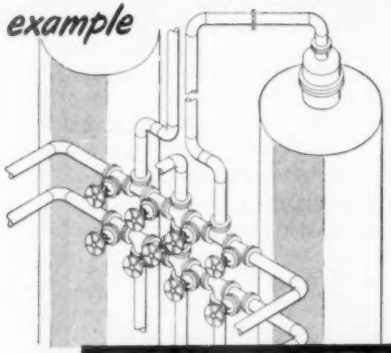
Oilfield Engines

Are You Getting Valve Satisfaction?

Like this Refinery

for example



THE INSTALLATION

Nine Crane valves on control manifold to reaction chambers on Perco Cycloversion Unit. Bareco Oil Company, Wichita, Kansas.

VALVE SERVICE RATINGS

SUITABILITY:	Matches service needs
MAINTENANCE COST:	None to date
CORROSION-RESISTANCE:	O.K.
SERVICE LIFE:-	Now more than 2 yrs.
OPERATING RESULTS:	Valve leakage stopped
PRICE:	In line
AVAILABILITY:	Local Crane supplier

THE HISTORY

Valves formerly used would not stay absolutely tight as necessary. Down time for repairs was excessive. Fluids handled: At oil inlet, straight run gasoline at 950 Deg. F., 85 psi; for catalyst regeneration, air-steam mixture at 850 Deg. F., 15 psi; regeneration waste gases, 1200 Deg. F. at 5 psi. Approximately 15-day cyclic operation.

Replacement made with Crane Valves. After more than 2 years' service, with no maintenance required, all Crane Valves are absolutely tight and operating at highest efficiency.

THE VALVE

Crane 300-Pound No. 5 Chrome-Molybdenum Alloy Steel Wedge Gate, with Stellite seats and patented flexible disc design. One of the complete Crane steel family for refinery services. See your Crane Catalog or get full data from your Crane Representative.

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This Bourdon Tube goes down the hole along with the Standard PRD. You get *both* records right after the test. Exacting engineers and geologists *want* both records – for the greater accuracy of the B. T. can make a whale of a difference.

Absence of packing glands in the Bourdon Tube make it *supersensitive* to the slightest variations of pressure changes. It is run with a blank chart made from sheet copper specially treated to withstand high temperatures of present day deep drilling. Clocks used to drive the B. T. are specially designed to withstand shock and high temperatures.

It is supplied in pressure ratings from 5,000 psi. to 15,000 psi. The base line or zero pressure line is drawn after the instrument is assembled. Recordings are measured in inches of deflection and converted to pressure from a calibration curve. The pressure readings are corrected to the bottom hole temperature of the well tested.

Halliburton's Testing Specialists are equipped to make field readings of the chart right after the test. But these readings are checked at the laboratory on a Micrometer Optical Chart Reader. You get a complete data sheet plus a *photographic* copy of the chart – leaving no chance for human error.

This big bonus of testing accuracy is yours at no extra cost. Make sure you get it on your next test. The Bourdon Tube is exclusive with Halliburton, so phone your nearby Halliburton Tester. Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

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★ *YOUR TEST CAN START MINUTES FROM NOW*

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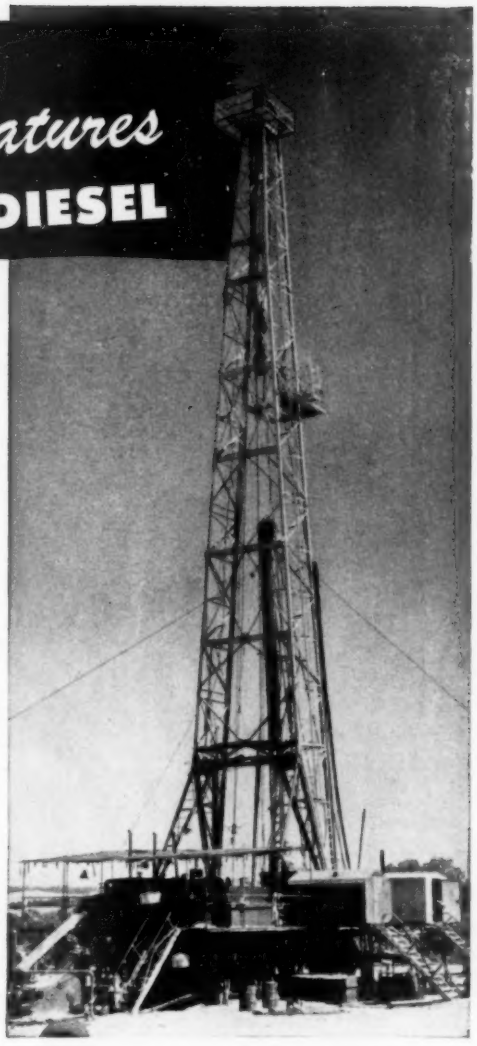

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- ✓ UNIT FUEL INJECTION
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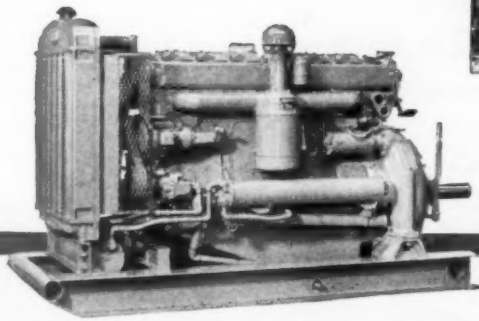
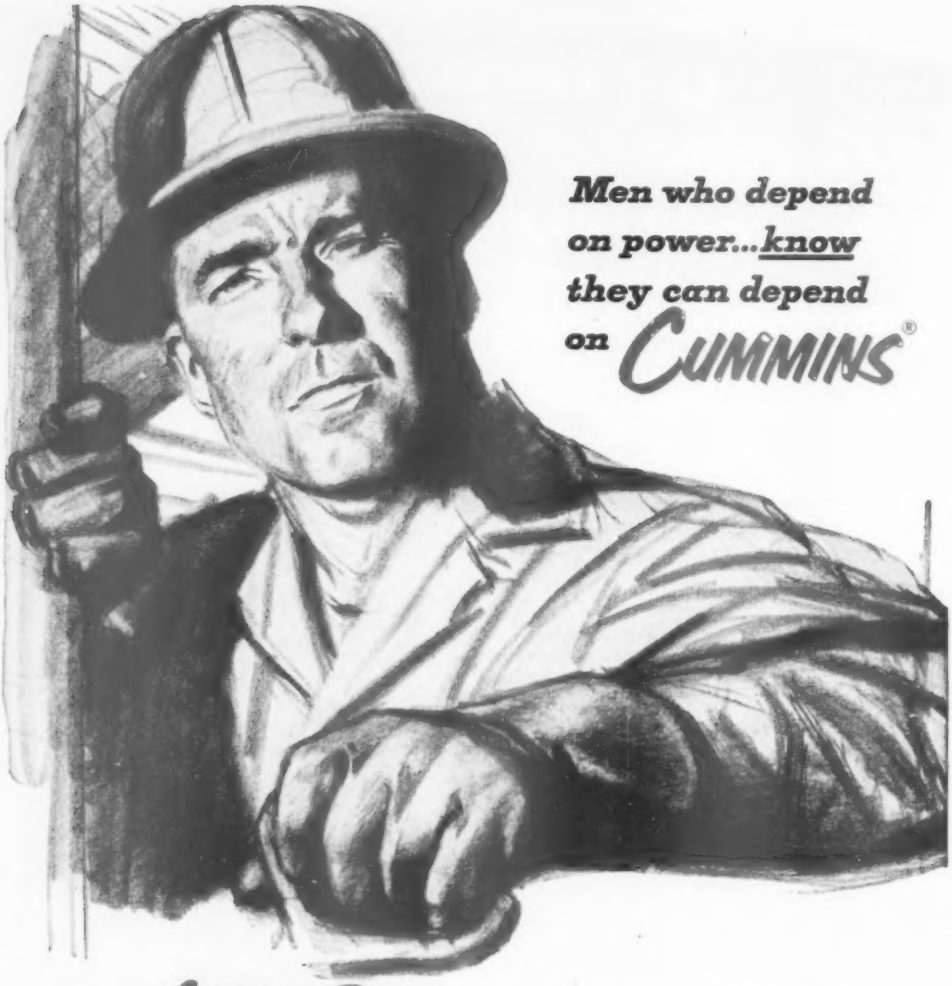
Illustrated is a Unit 15 rig and Emsco mud pump powered by three Murphy Diesels each rated at 160 H.P. continuous, 180 H.P. intermittent. The rig is owned by H. L. Rowley, Inc., Shreveport, Louisiana.



Heavy duty power for the oilfields

Murphy Diesel Engines and Power Units for drilling and pipe line pumping, 90 to 226 H.P., 1200 and 1400 RPM. Generator Sets, 60 to 140 K.W. Dual-Fuel Engines, 135 to 180 H.P. Also Crude Oil Burning Engines.

MURPHY DIESEL



Men who depend on power...know they can depend on CUMMINS®

Every CUMMINS DIESEL is built not once but twice

Oil field men have learned to count on Cummins Diesels for dependable power day in, day out.

What's behind this consistent reliability? One good reason is the fact that every Cummins Diesel is actually built *twice*. After initial assembly, and run-in testing, every engine is disassembled, inspected; then reassembled and tested again.

This extra care—together with Cummins' economy-proved fuel system and efficient parts and service organization—makes lightweight, high-speed (50-550 h.p.) Cummins Diesels a wise first choice *for men who depend on power.*

Whatever your power needs, whether it's for drilling, pumping, or hauling, portable power units or generator sets . . . or any other important jobs . . . your Cummins dealer is the man to see.

CUMMINS ENGINE COMPANY, INC., Columbus, Indiana

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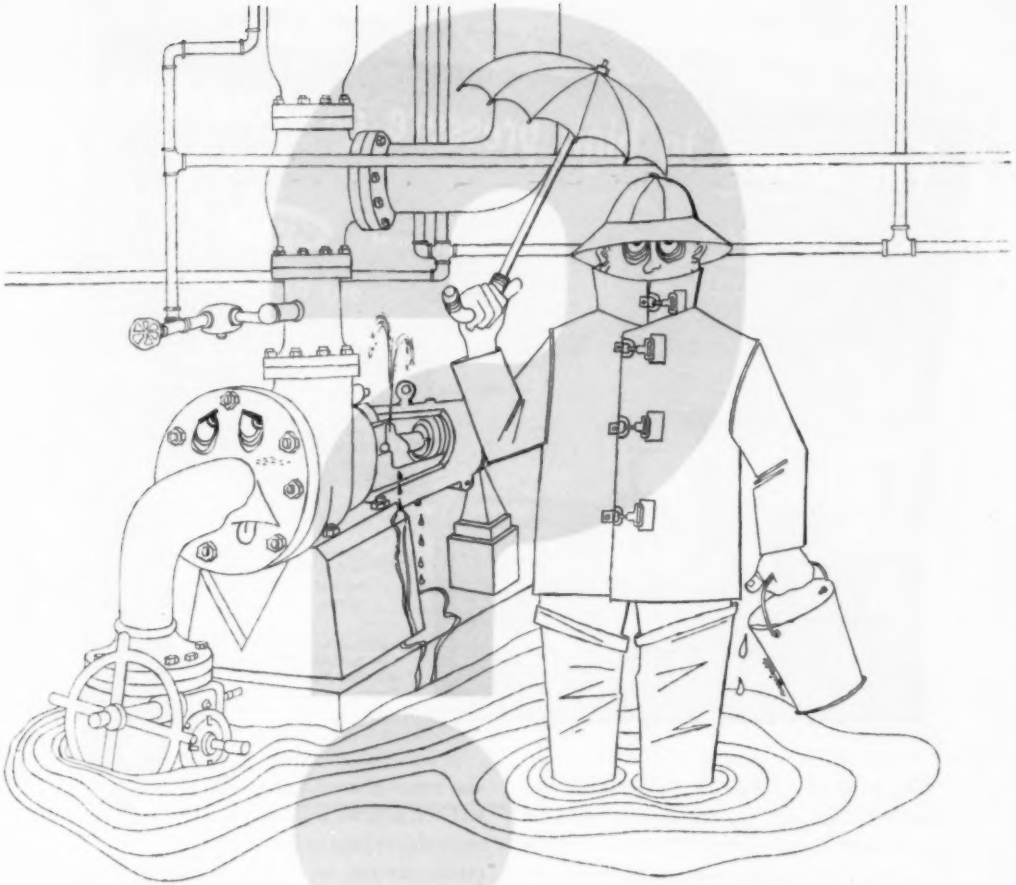
***Leaders** in lightweight, high-speed diesel power!*



*Who needs a mechanical seal?**

If you've got hip boots, a bucket and a standby maintenance crew with nothing to do, why bother with a BJ Mechanical Seal? Take a devil-may-care, every-pump-for-itself attitude and let the packing fall where it may. Or if your maintenance department enjoys a "Quick-save-the-dikes" sort of life, they will have great fun poking in packing before the stuff completely goes.

BUT . . . if your business allows little room for exciting crises and repacking picnics, you should know about the BJ Mechanical Seal. This excellent, precision-made seal – available in a number of engineered types – takes the trouble right out of any stuffingbox. There's no leakage . . . no waste . . . no contamination of pumped liquid . . . no volatile liquid hazard . . . no profit-robbing repacking and delivery-delaying downtime.

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SEE BJ FOR THE ENGINEERED ANSWER TO YOUR PUMPING PROBLEMS

The answer to high pressure gas scrubbing

The Problem

Cleaning waste liquids and solids from gas for pressurized reinjection into wells.

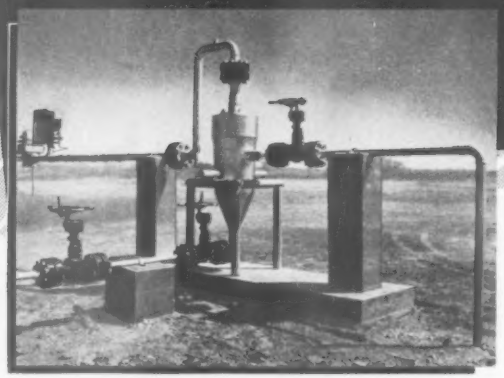
The Equipment

AEROTEC

DRY GAS SCRUBBERS

The Results

1600 gallons of waste products extracted daily from 9 million cubic feet of reinjection gas.



Installations of Aerotec Gas Scrubber at University, Block 31, Field, Crane County, Texas.

Cutaway section of Aerotec Gas Scrubber designed for high pressure applications.

New Proof of the practical, profitable advantages of Aerotec Dry Gas Scrubbers comes from the oil-producing industry. This backs up the long experience of natural gas companies with hundreds of units in daily use. These Aerotec Scrubbers, at wells and in pipelines, are cleaning foreign liquids and solids from natural gas with exceptionally high efficiency.

This Aerotec high pressure application is successfully employed by the Atlantic Refining Company in a jointly-owned claim in the University, Block 31, Field located in Crane County, Texas. The Aerotec Gas Scrubber removes components of lubricating oil from gas going to injection wells at 4,000 psi. It has also removed sand, mill scale and iron sulfides, and because no fluids are used in the separation process, no residue is carried over to the gas.

Additional units are now being installed before new injection wells are put into operation.

Lightweight and compact, Aerotec Gas Scrubbers are easy to install. Available in standard units up to 100,000,000 SCFD, they can be manifolded to meet larger requirements. For experienced engineering assistance in matching Aerotec Scrubbers to *your* specific need, or for catalog data on these units, call or write The Thermix Corporation.

Project Engineers **THE THERMIX CORPORATION** Greenwich, Conn.

(Offices in 38 Principal Cities)

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Manufacturers

THE AEROTEC CORPORATION

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William M. Barret, Inc.

in observing its 25th Anniversary of service to the petroleum and mining industries, is pleased to announce the wider availability of

RADOIL

for exploration and field definition

Another in a series designed to explain the function and application of the RADOIL method.

RADOIL*

HOW DOES RADOIL COMPARE WITH OTHER EXPLORATORY TECHNIQUES?

During the past quarter-century the petroleum industry has achieved notable success in increasing the nation's as well as the world's petroleum reserves through the use of the seismic, gravitational and magnetic methods of exploration. These methods have located oil deposits *indirectly* by finding structural conditions that generally are favorable for the accumulation of oil.

In contrast to these structural methods, RADOIL is a geophysical technique for the *direct* location of oil. Through the agency of radio waves, it provides a unique method of mapping directly the location, outline and depth of oil-saturated zones in any of the known forms of structural, stratigraphic and lithologic traps.

The RADOIL method is not intended to replace the structural methods of geophysical exploration. On the contrary, its chief usefulness begins where the other methods leave off. It is best employed where other techniques have predetermined the presence of geological conditions favorable for the accumulation of oil. When thus applied, RADOIL bridges the wide and often costly gap between a structural prospect and a worthwhile oil field. And it does this with a high degree of reliability.

RADOIL is available for domestic and foreign operations, through contract and licensing arrangements. Detailed information will be furnished on request. Inquire also about the RADORE method, an adaptation of RADOIL for use in locating ore deposits.

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DRAWWORKS?

By all means get a WHELAND!

Put the console of the Wheland B-85 in a safe spot and you're in the saddle with fingertip control. Prepare to handle fast, quiet, rugged equipment!

With 4½" drill pipe this new Wheland B-85 will do anything you want done up to 10,000 feet. It has advantages in control, visibility, and safety that have not been available in drilling equipment at any price.

FOR DRILLING TO 10,000 FEET with 4½" drill pipe

WHELAND
B-85 DRAWWORKS
WITH CONSOLE CONTROL

Discuss this new Wheland with the men at your near-by Jones & Laughlin Supply store. Get our bulletins on Wheland Drawworks, Slush Pumps, Rotaries, Crown Blocks, Traveling Blocks, and Swivels.

AMERICA NEEDS SCRAP TO MAKE MORE STEEL

Jones & Laughlin Supply Company

J&L STEEL

Subsidiary of Jones & Laughlin Steel Corporation

EXPORT: 405 Lexington Ave., New York, N. Y., U. S. A.
88 STORES • 19 OFFICES • 9 RESIDENT SALESMEN
General Offices: TULSA, OKLAHOMA

"Tiger Brand Wire Lines are the best we ever used"

SAYS JOHN CAMPBELL, driller for Glen A. Gillespie & Sons

● Ask a driller what he thinks of his wire lines and he'll usually give a straight-forward answer. If he's had trouble, he'll give you an earful. But if the lines gave good service, he'll tell you that, too.

John Campbell, driller on the No. 1 Rig of Glen A. Gillespie & Sons says, "I've used a lot of different lines in my time but I can truthfully say that American Tiger Brand is the best we have ever used."

The No. 1 Gillespie rig has a portable derrick they made in their own shop. It was drilling near Cushing, Oklahoma, when these photographs were taken. The average drilling time underground was 7 days which is good speed in this area.

They use American Tiger Brand one inch 6x19 Excellay Preformed Monitor with I.W.R.C. (Independent Wire Rope Core.) This is the finest rotary line you can buy—bar none! It has just the right combination of strength, flexibility and abrasion resistance . . . plus the ability to withstand the increased fatigue caused by small sheaves.

Tiger Brand Wire Lines are made for every oil field use—drilling, well servicing, pipe-line laying or what have you. Write for our handbook giving complete information.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL COMPANY
GENERAL OFFICES: CLEVELAND, OHIO

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

DRILLING CONTRACTORS are quick to spot the wire lines that give the most service per dollar spent for lines. Glen Gillespie & Sons use American Tiger Brand on all their rigs.

USS

AMERICAN TIGER BRAND WIRE LINES

Excellay Preformed

UNITED STATES STEEL

THE OLD WAY

There's a new . . . a better way to recover condensate from gas wells

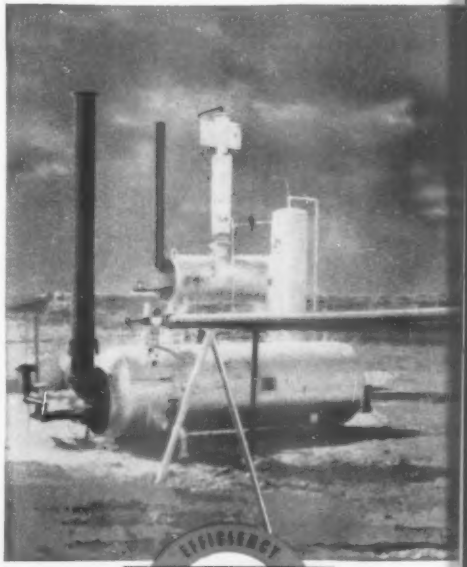
Recovery-Conscious, Profit-Wise Operators Are Doing It With The

BS&B Glycol Injection System* OF LOW TEMPERATURE SEPARATION With STABILIZER**

There's a better way . . . and BS&B has come up with it! The old way is now the costly way . . . because it fails to give the maximum recovery now possible through the BS&B Glycol Injection System of Low Temperature Separation with Stabilizer. Glycol injection permits cooling the wellstream well below the hydrate point before expansion. By using a regenerative heat exchanger lower separator temperatures can be obtained than are possible in even the most efficient conventional low temperature separation systems. This lower temperature allows a greater liquid recovery. Should the available pressure drop fall below approximately 1000 p.s.i. required for satisfactory operation of conventional low temperature separation units, the BS&B Glycol Injection System will continue to produce pipeline specification gas even with available pressure drops of as low as 400 p.s.i.

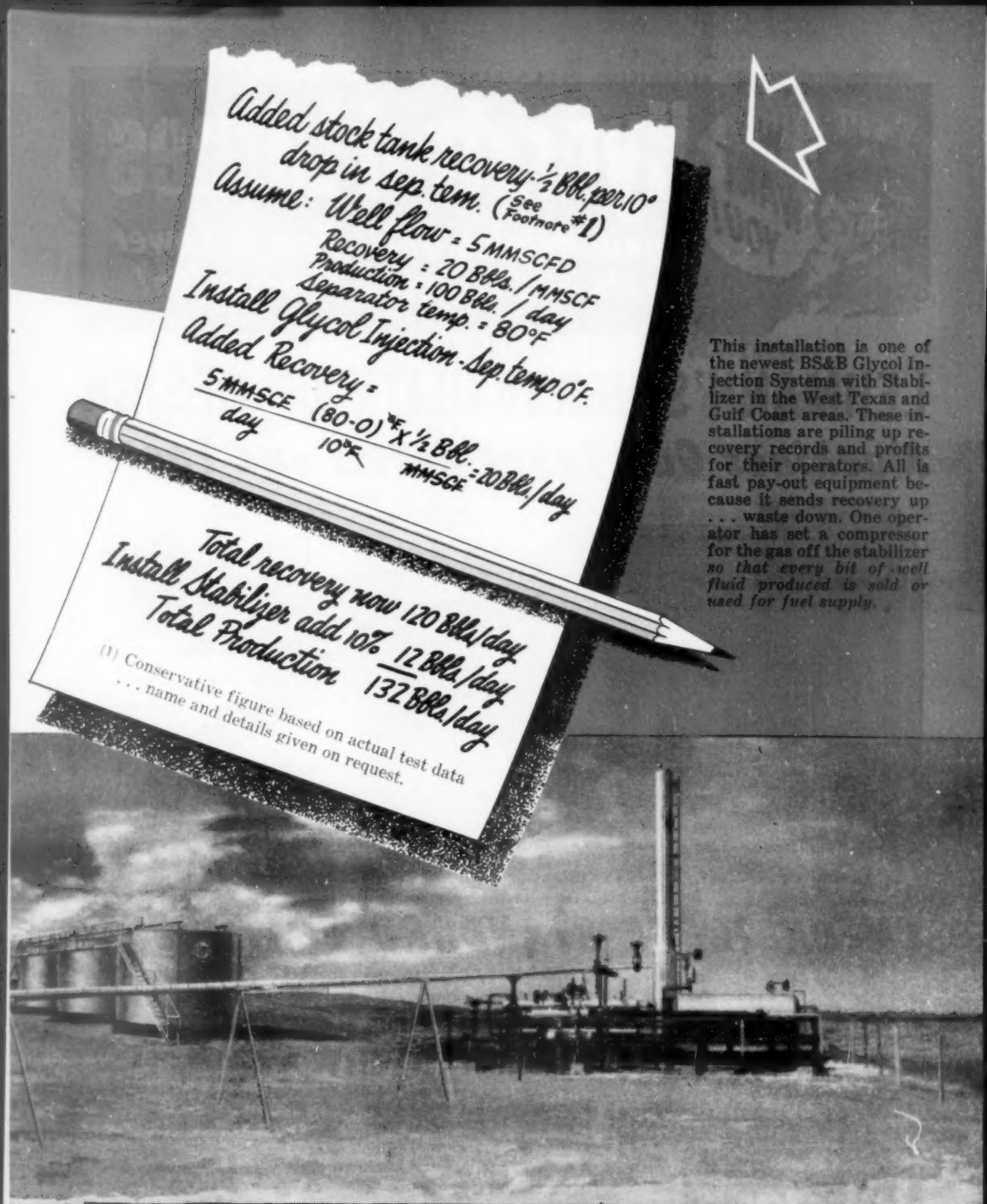
But the recovery picture is not complete without the BS&B Stabilizer. This part of the system is today's most efficient method of getting this extra production to the stock tank—and keeping it there! The Stabilizer is a distillation column. It directs the light, wild hydrocarbons — methane, ethane, and propane—to sales. The medium and heavy hydrocarbons go to storage. The light hydrocarbons do not reach the stock tank to flash and strip the medium "easily influenced" hydrocarbons—butane and pentane—with them. You're able to keep your extra production! This much-talked-about complete recovery system can be applied to one or several wells . . . has complete versatility for off-shore or in-swamp use. Maybe you're doing it the old way . . . you'll be recovery and dollars ahead to investigate and invest in the BS&B Glycol Injection System of Low Temperature Separation *with* Stabilizer.

*Patented
**Patent Pending



EFFICIENCY BS&B RELIABILITY OUR 60TH YEAR

BS&B . . . for 60 years a leader in oil & gas producing and refining equipment . . . also manufacturers of Climax Controls, Safety Devices and special fabricated pressure vessels. Ask your BS&B Man. There's one of BS&B's 35 Branches or 17 Sales Offices near you if you're in the Oil Country . . . or write . . .


Added stock tank recovery ½ Bbl. per 10° drop in sep. tem. (See Footnote #1)
Assume: Well flow = 5 MMSCFD
Recovery = 20 Bbls. / MMSCF
Production = 100 Bbls. / day
Separator temp. = 80°F
Install Glycol Injection - Sep. temp. 0°F.
Added Recovery =
5 MMSCF / day (80-0)°F / 10°F x ½ Bbl. / MMSCF = 20 Bbls / day
Total recovery now 120 Bbls / day
Install Stabilizer add 10% 12 Bbls / day
Total Production 132 Bbls / day
(1) Conservative figure based on actual test data . . . name and details given on request.

This installation is one of the newest BS&B Glycol Injection Systems with Stabilizer in the West Texas and Gulf Coast areas. These installations are piling up recovery records and profits for their operators. All is fast pay-out equipment because it sends recovery up . . . waste down. One operator has set a compressor for the gas off the stabilizer *so that every bit of well fluid produced is sold or used for fuel supply.*

BLACK, SIVALLS & BRYSON, INC.

Oil & Gas Equipment Division, Dept. 1-A11

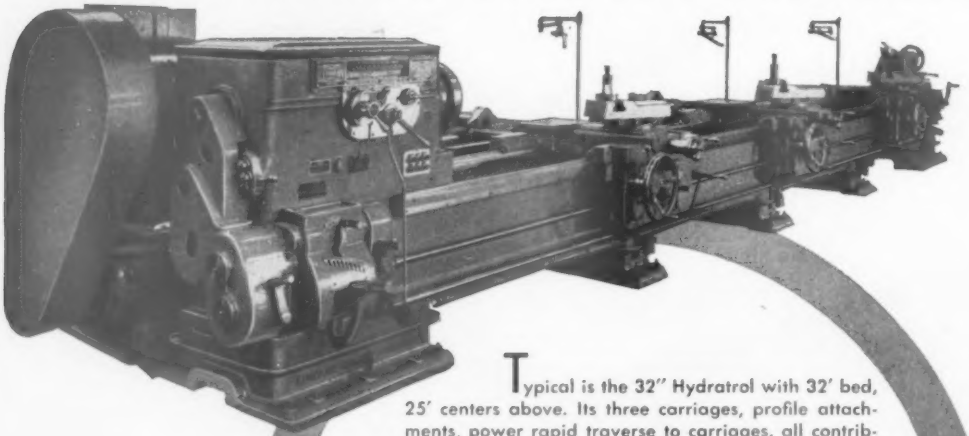
2131 Westwood Blvd. Oklahoma City, Oklahoma

Hydratrol Lathes

Again Helping Uncle Sam to Lower Costs and Increase Production!

LEHMANN'S VERSATILITY OF DESIGN

Machines Gun Tubes Better and Faster



Typical is the 32" Hydratrol with 32' bed, 25' centers above. Its three carriages, profile attachments, power rapid traverse to carriages, all contribute to doing the rough and finish turning of the O. D. on gun tubes better and faster.

CHECK THESE STANDARD FEATURES

- Hydraulically operated speed changes.
- Simplicity in construction, simplicity and safety in operation.
- Automatic Slide Rule indicates spindle speeds, operation numbers, cutting speed.
- Self-compensating hydraulic friction clutches and brakes.
- Speed changes through positive clutches, gears remaining in constant mesh.
- Spindle release for chucking.
- Perfect, safety control lubrication with filtered oil.

Six Sizes

Medium Duty 16"-18"
Heavy Duty 20"-25"
Heavy Duty 32"-36"
Heavy Duty 40"-50"

Lehmann
MACHINE COMPANY

CHOUTEAU AT GRAND • ST. LOUIS 3, MO.

PETROLEUM CHEMICALS DIVISION
NEWS

November ★ One of a Series of Interest to the Petroleum Industry ★ 1952

YOUR CUSTOMERS...Have you recently reminded them of these rules for good driving?

1. Avoid high speeds. Drive at a reasonable speed that will get you there on time.
2. Drive the road ahead. Watch traffic and lights. Pace driving to make as few stops as possible.
3. Make slow easy starts. Shift to high as soon as possible.
4. Under normal driving conditions, don't press the accelerator to the floor.
5. Avoid sudden stops.
6. Adjust seat so legs are comfortable for a light steady pressure on the accelerator. Don't pump the pedal!
7. On open stretches maintain a constant speed.
8. On up-grades don't attempt to maintain constant speed.
9. Be sure tires are inflated to proper pressure.
10. Use the proper grade lubricants for anticipated seasonal weather conditions.

Complete Manual on Gasoline Dyes Soon Available

New booklet on Du Pont Gasoline Dyes contains all the information a refiner needs to know about dyeing gasoline.

Ever since tetraethyl lead was first used as an antiknock compound, coloring has been an important factor in making gasoline.

Gasoline dyes, however, have for a long time presented a number of han-

dling problems. And it was not until recently that efficient methods of addition were worked out.

All of the latest methods of dyeing gasoline are fully discussed in a new booklet, "Du Pont Gasoline Dyes." It covers the dry dye eductor system as well as the various other methods of addition by dye pot.

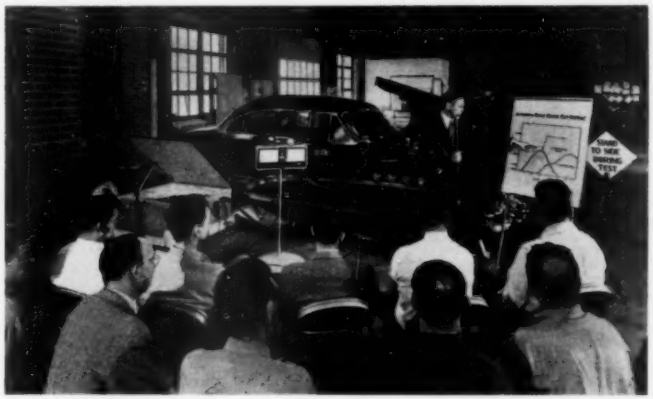
The booklet also gives complete information – including solubility charts and spectrophotometer curves – on all the Du Pont gasoline dyes. And it contains full data on meeting color requirements for military, aviation and leaded motor gasoline.

In addition, the booklet includes much helpful information on handling dyes; such as how to remove dye stains from clothing and equipment – and useful shipping information.

This booklet will soon be available to refiners through the Du Pont Petroleum Chemicals Division district offices.

New Dynamometers Broaden Usefulness to Refiners of Du Pont Test Car Fleet

When a car engine knocks, the cause may be from a variety of factors other than gasoline quality. This fact is readily demonstrated to fleet owners or other groups by the new Petroleum Chemicals Division traveling dynamometers which are part of Du Pont's fleet of 53 road octane test cars.



ROBERTS W. BROKAW, JR., Du Pont representative, uses the Du Pont test car and dynamometer combination for demonstrating road knock by the Uniontown method.

Suppose you want to show a customer group the effect of speed, spark advance, air-fuel ratio, operating temperature, and altitude as well as fuel quality on engine performance and octane requirement. The Du Pont test car combination is all that is needed to make a convincing demonstration.

ANSWERING QUALITY COMPLAINTS

Suppose, on the other hand, you want to refute quality complaints with a dash of real showmanship. The dynamometers can be employed to point up the effect of poor operating maintenance on engine performance . . . by simulating faulty ignition, fouled spark plugs, over-advanced spark timing and improper carburetor adjustment.

OVER

ADVERTISEMENT—Prepared for the Petroleum Chemicals Division of E. I. du Pont de Nemours & Company (Inc.)

PETROLEUM CHEMICALS DIVISION
NEWS

CONTINUED *Dynamometers*

These versatile dynamometers are each equipped with a speedometer, road power meter, fuel flow meter, air-fuel analyzer, intake vacuum gauge and various temperature indicators. An easel and a public address system together with special microphones to amplify the speaker's voice all help make the demonstration clear and understandable.

FLEXIBLE PROGRAM

Du Pont automotive specialists have been trained for putting on dynamometer demonstrations. A wide choice of program material is offered and can be readily tailored to meet the specific needs of an individual oil company.

The length of time required for a demonstration is completely flexible . . . ranging from one hour to a full afternoon. And the equipment can be set up outdoors or in any large room or building having adequate ventilation.

Refiners and marketers who are interested in learning about this new sales promotion tool should get in touch with the nearest Du Pont Petroleum Chemicals Division district office for details.

Copper Picked Up By Gasoline in Pipeline

It is often difficult to trace the exact source of contamination when copper is found in gasoline. Therefore, the following case history of copper picked up by gasoline during pipeline transfer is of interest.

A new products pipeline was recently put into operation by an oil company. Gasoline entering this pipeline with an induction period of 14 hours was found to leave the pipeline 416 miles away with an induction period of 5 hours.

To determine the source of contamination, the copper content of the gasoline was checked at various points along the pipeline. It was found to be building up in proportion to the miles traveled through the line, from .10ppm initially to .22ppm at the destination.

Further investigation showed that engines at the pump stations along the pipeline were being cooled by copper heat exchangers. And it was discovered that gasoline circulating around the copper coils, which carried water at approximately 150° F., was picking up sufficient copper to cause the difficulty. The pump impellers, which were fabricated of an alloy containing copper, were also contributing to the trouble.

At this stage Du Pont Metal Deactivator was used to counteract the copper contamination. It was found that only ¼ lb. of the deactivator per 1,000 barrels of gasoline, added at the pipeline exit, was needed to restore the original 14-hour induction period.

Normally it would be recommended to add Metal Deactivator to gasoline *at the refinery*, before it entered the distribution system.

Bernard Miller Sturgis

Bernard M. Sturgis is head of the Combustion and Scavenging Research Division of the Du Pont Petroleum Laboratory. He is in charge of fundamental research on combustion problems and on the problems associated with deposits in engines, as well as the development of and evaluation of new additives in these fields.

Sturgis joined Du Pont in 1936 after having won a 4-year Thomas A. Edison scholarship which helped him toward obtaining his Ph.D. degree in chemistry at M.I.T.

Among various duties at Du Pont's Jackson Laboratory, he did fundamental research on vulcanization and on the properties of stretched rubber. Later he was made group leader in charge of all research on chemicals for natural and synthetic rubber and on polymerizable monomers. During this time he obtained 27 patents and published several papers in this field.

Before being transferred to the Petroleum Laboratory in 1951, he was head of the Petroleum Chemicals Division of Jackson Laboratory in charge of research on tetraethyl lead, combustion and petroleum additives.

LITERATURE AVAILABLE

Here is a partial listing of the bulletins, reports, booklets and aids available to you through your Du Pont Petroleum Chemicals Division district office:

Safety for the Small Refinery – A 42-page book on how to set up an effective small refinery safety program Serial A-2848

Tank Talk – A 52-page, easy-to-understand safety booklet for tank-cleaning crews Serial A-1134

Stability of Present-Day Gasolines – A 12-page paper on the value of storage tests—as compared with induction period—for determining stability of modern gasolines Serial A-3199

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Better Things for Better Living
. . . through Chemistry

Petroleum Chemicals

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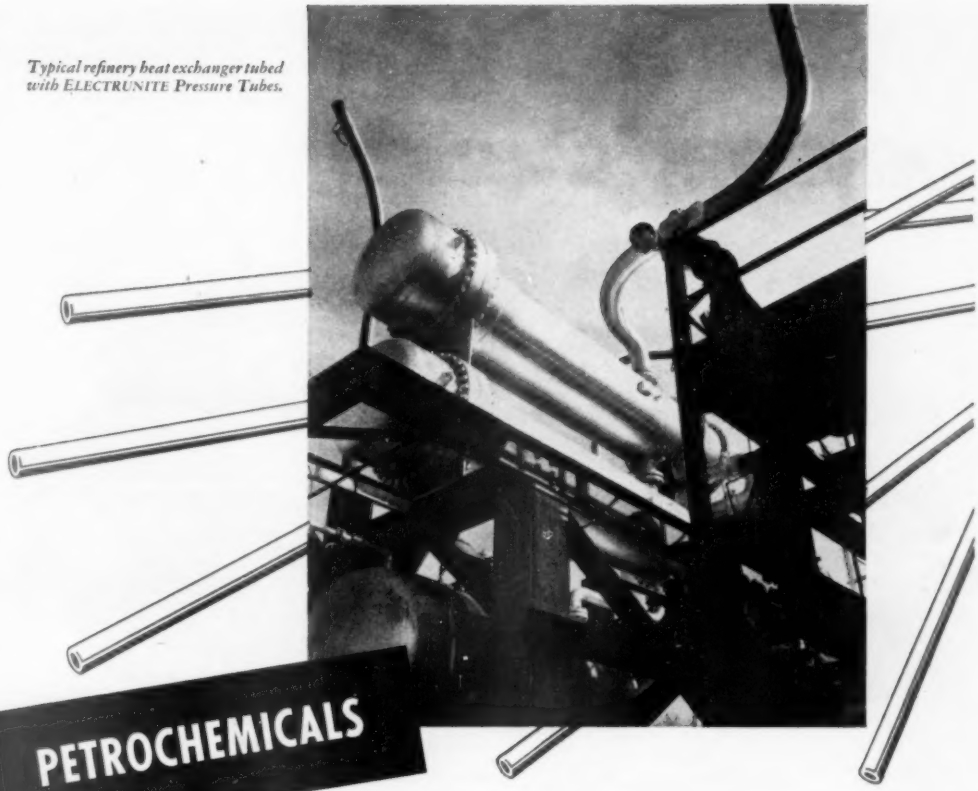
A-4406

Printed in U. S. A.

Typical refinery heat exchanger tubed with ELECTRUNITE *Pressure Tubes.*



PETROCHEMICALS

...another industry that stays on-stream with REPUBLIC ELECTRUNITE PRESSURE TUBES

Run through a list of the scores of different petrochemicals . . . count off the leading producers . . . you'll have lists that include hundreds of large installations and important users of Republic ELECTRUNITE Heat Exchanger, Condenser and Boiler Tubes.

The ELECTRUNITE process assures users that Republic's Pressure Tubes are top-quality inside and out . . . that tubes are uniform in wall thickness, roundness, and ductility. They are uniformly corrosion-resistant throughout the metal and full normalizing assures easier rolling-in properties in every length.

Let us tell you more about these pressure tubes that bend right, roll-in tight, stand up better wherever carbon or stainless steel tubes are specified.

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50th ANNIVERSARY 1902 1952 STEEL and TUBES DIVISION
ELECTRUNITE TUBING

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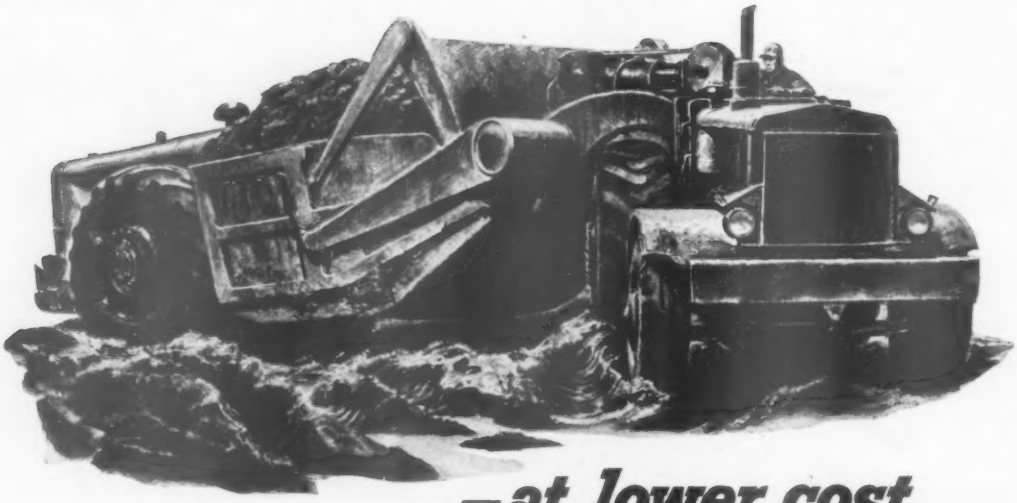
BOILER, CONDENSER AND HEAT EXCHANGER TUBES

Moves big payloads faster



—at lower cost

BIG earth-moving vehicles like this twin-engine self-loading scraper get more work done faster because of Allison TORQMATIC DRIVES. These time-proved hydraulic drives — more than 10,000 have been built for Army tanks and heavy-duty vehicles—make multiple engine applications possible —and practical.

TORQMATIC DRIVE provides a smooth, steady, oil-cushioned flow of power—high-starting torque with uninterrupted acceleration —protection against shock-load damage to engines and equipment. It eliminates engine lugging and stalling while maintaining power to drive wheels at all times. This permits the engine to operate in its most effective speed range by balancing engine power with load requirements.

Users of trucks, scrapers and other vehicles equipped with TORQMATIC DRIVE *report up to 30% more work done and 15% less cost per yard than with a mechanical drive* — additional good reasons why engineers are designing Allison TORQMATIC DRIVES into all types of heavy-duty equipment.

Allison TORQMATIC DRIVES are the only heavy-duty full torque-shifting vehicle transmissions available today—engineered for compactness, permitting flexibility of drive-train design for today's and tomorrow's vehicles.

Like to know more about TORQMATIC DRIVES? Write us for Engineering Data Bulletin which gives full specifications.

ALLISON *Division of* GENERAL MOTORS
Box 894J, Indianapolis 6, Indiana

GM GENERAL MOTORS

Allison **TORQMATIC DRIVES**

Compact, efficient hydraulic drive for . . .

CRANES TRACTORS TRUCKS SHOVELS LOCOMOTIVES DRILLING RIGS

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TULSA

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EXPLORATION
DRILLING
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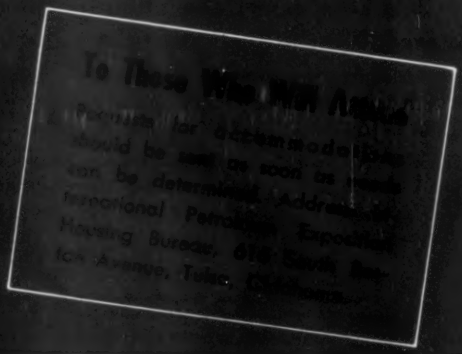


The finest welding fittings available are made from seamless steel tubes forged in Globe's Foren Mill . . . the only one of its kind in the entire Steel Tube Industry.

GLOBE WELDING FITTINGS ARE BORN HERE

Only Globe seamless welding fittings are precision processed from *billet*... to *tube*... to *fitting*

Globe precision-process manufacture begins with the billet — continues through the making of the seamless steel tube — and extends through to the production of the finished fittings.

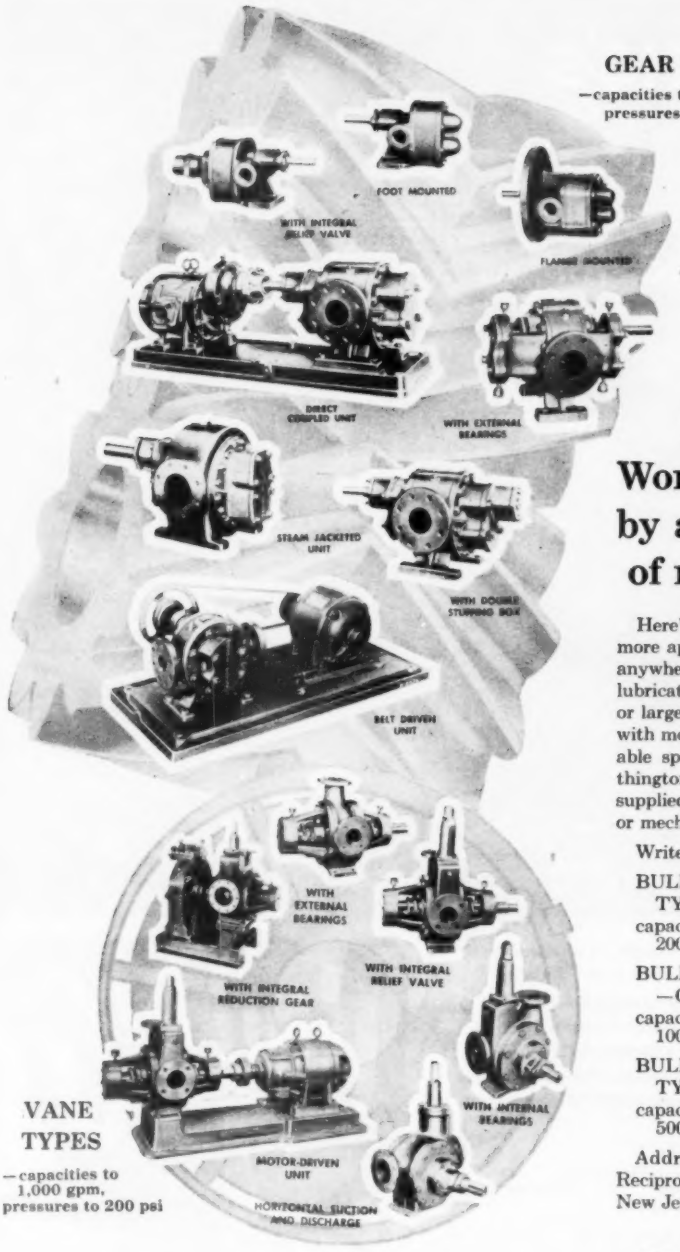
The exacting controls in Globe's precision process — plus specialized research, testing and engineering insure uniform high-quality and close tolerances. Be sure of dependable fittings . . . always specify Globe.

GLOBE STEEL TUBES CO., Milwaukee 46, Wisconsin

Chicago • Cleveland • Detroit • Philadelphia • St. Louis
Denver • Houston • San Francisco • Glendale, Cal.

Producers of Globe seamless stainless steel tubes — Gloweld welded stainless steel tubes — alloy — carbon — seamless steel tubes — Globeiron (high purity ingot iron) seamless tubes — Globe Welding Fittings.

For complete information on the finest welding fittings available anywhere, send for the Globe Welding Fittings Catalog.



GEAR TYPES
—capacities to 5,000 gpm, pressures to 500 psi

VANE TYPES
—capacities to 1,000 gpm, pressures to 200 psi

This is what Worthington means by a "complete line" of rotary pumps...

Here's one rotary pump line that covers more applications than any you can find anywhere. Whether you pump thin, non-lubricating liquids or viscous liquids, small or large capacities, low or high pressures, with motor, turbine, engine, belt, or variable speed motor drive, there's a Worthington rotary that'll do your job. Units supplied with either conventional stuffing or mechanical seal.

Write for informative bulletins:

BULLETIN W-485-B1—VANE TYPES
capacities to 1,000 gpm, pressures to 200 psi

BULLETINS W-484-B1A AND B2—GEAR TYPES
capacities to 56 gpm, pressures to 100 psi

BULLETIN W-487-B10C—GEAR TYPES
capacities to 5,000 gpm, pressures to 500 psi

Address: Worthington Corporation, Reciprocating Pump Division, Harrison, New Jersey.

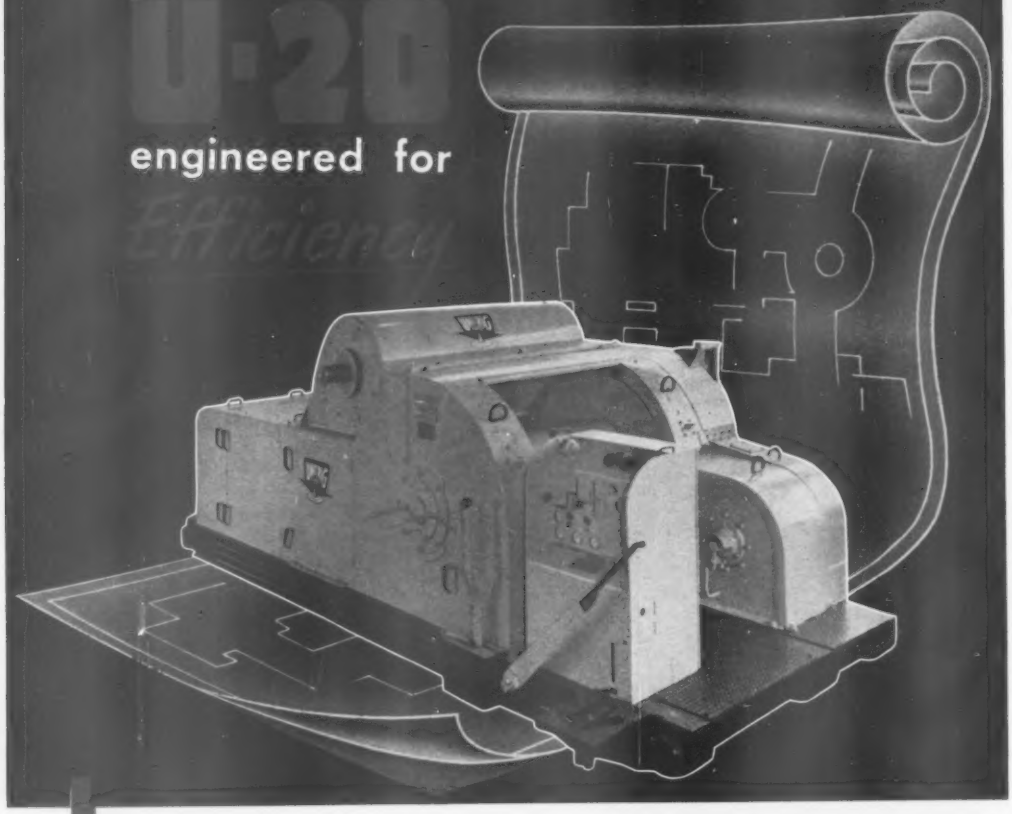
P.2.4A

The World's Broadest Line Assures You the Right Pump for Every Job

WORTHINGTON
Rotary Pumps

UNIT RIG'S U-20

engineered for Efficiency



Designed to offer the maximum in efficiency, the Model U-20 features:

COMPACTNESS — for ease of transportation. SPEED — for faster drilling. RUGGEDNESS — for longer life. ECONOMY — of operation for 7000 to 12000 ft. drilling. CONTROLS — planned for convenience of the driller. MINIMUM RIG UP TIME — with single package drawworks and transmission.

Buy Efficiency - - - Buy The Best - - - Buy The U-20

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TULSA, OKLAHOMA U.S.A.

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UNIT RIG DRAWWORKS ARE SOLD EXCLUSIVELY THROUGH THESE AUTHORIZED DISTRIBUTORS IN THE U.S.A. AND CANADA

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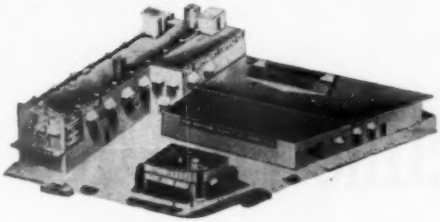

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of

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- Ac-Me Recording Gravitometer
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- Ac-Me Pressure Vacuum Pump
- R. S. Portable Vacuum Pump
- R. S. Mercury Cleaner
- R. S. Manometer
- R. S. Dead Weight Gauge
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- R. S. Orifice Well Tester
- R. S. Moisture Tester
- R. S. Flat Bore Yel-O-Bak Thermometers
- R. S. Streamlined Hydrometers
- R. S. Pulsameter
- R. S. Pressure Hydrometer Jars
- R. S. Vapor Pressure Bomb
- R. S. Diamond Core Drill
- R. S. Thermo Plumb Bob Thermometers
- R. S. Thermostat Temperature Controls
- R. S. High Pressure Consistometer
- R. S. Smoke Meters

Complete Line of Scientific Laboratory Equipment

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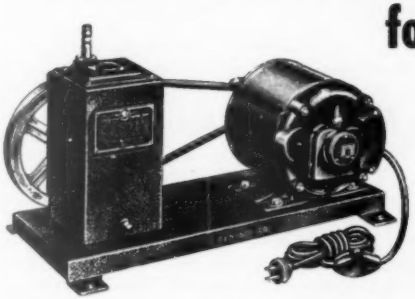
Also Complete Line of CENTRAL SCIENTIFIC SPECIALTIES

NEW CENCO-PRESSOVAC PUMP for PRESSURE or VACUUM



No. 90550A New Cenco - Pressovac Pump (for vacuum only) for 115 volts, 60 cycles.

No. 90510A Cenco-Pressovac Pump (for pressure and vacuum) for 115 volts, 60 cycles.

Economical and Effective

Whether your high vacuum requirement be filtration—distillation—transference of liquids—evaporation, the New Cenco-Pressovac Pump is fast, economical and serviceable. Try it for effective high vacuum with high pumping speed and quiet operation. Furnished with reliable motors for standard currents and voltages.

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Vacuum Engineering Bulletin 10

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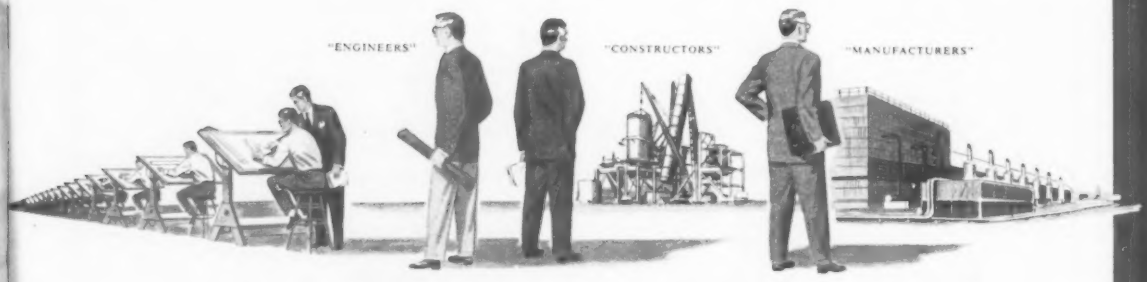
How would you define FLUOR?



Some say it's an Engineering Firm,
others say it's a Construction Company.
Still others call Fluor a Manufacturer. Actually ***Fluor is all three!***

Because of the breadth of Fluor's activities since the turn of the century, different people in different industries have identified Fluor as an engineering firm, a construction company, or a manufacturer of cooling and processing equipment. This is understandable.

It is because, where clients have used Fluor's highly specialized services *individually*—engineering, construction *or* manufacturing—satisfaction itself has identified Fluor as an expert in the particular service successfully performed. This can be good. But it can also be limiting to the industries which Fluor serves.

It can be limiting in the sense that the satisfied client of a *single* Fluor service may, through incomplete identification, miss the benefits of Fluor's *complete* service—engineering, construction *and* manufactured products. Whenever you plan new construction or the expansion of old, compare *all* of Fluor's qualifications and services. The abilities to design, engineer and construct complete plants and facilities for the petroleum, chemical and other heavy industries—anywhere in the world—on time and within appropriation, have been proved time and time again.

These facts about Flour give the complete story of what Fluor does—what Fluor has to offer *you*. More detailed information may be obtained from your nearest Fluor representative. He will be pleased to cooperate in any way possible. You can be *sure* with Fluor!

These Facts make Fluor a World Wide Organization

A MANAGEMENT KNOWN FOR ITS EFFICIENT ORGANIZATION
—of Fluor—of your project within Fluor

The ability to organize in the face of constantly changing conditions accounts for Fluor's steady growth into recognition as a major engineering and construction firm. Good organization is demonstrated in the pride and teamwork evident throughout Fluor—in the handling of client's projects within Fluor. Each project has its own unit job organization under *one* project manager. He draws upon the many technical groups which make up Fluor and is responsible for your project—from beginning to completion.

A RESEARCH AND DEVELOPMENT DIVISION
for the study of problems—the development of ideas

Fluor's Research and Development Division is staffed with technically educated and thoroughly experienced chemical engineers, chemists, physicists, and mechanical engineers, specializing in fundamentals and problems relating to the gas and petroleum processing industries and phases of the petrochemical and chemical industries. These personnel and facilities are available at all times to Fluor's engineering groups for the study of unusual problems and development of new ideas.

A PURCHASING GROUP—AN ACCOUNTING GROUP—
wide in scope—flexible in operation.

These two highly specialized departments play a vital role in the successful and satisfactory completion of Fluor projects. They are geared to coordinate both inter-departmentally and with the established procedures of customer and vendor companies. Their services include the purchasing, inspection and expediting of materials and equipment for job sites anywhere in the world, and the establishment of efficient accounting systems according to individual client requirements. Broad experience is evidenced—material and equipment is being currently purchased at the rate of over $5,000,000 a month!

A LARGE RESERVOIR OF ENGINEERING TALENTS—
with broad, diversified experience—modern facilities

Fluor's Engineering Division is permanently staffed with over 800 chemical, process, mechanical, electrical, instrument, civil, architectural and hydraulic engineers and draftsmen. Headquartered in Los Angeles and Houston in modern buildings designed specifically for the expeditious handling of a large variety of engineering services, the broad and diversified experience of these groups embraces all types of projects—from the smallest unit to the largest—in natural gas, petroleum, petrochemical and industrial fields.

AN EXPERIENCED CONSTRUCTION ORGANIZATION—
skilled in all crafts—world-wide in reputation

Working in parallel and complementing the skills of Fluor's engineering groups, the Construction Division is permanently staffed with over 250 key men who are experienced in the construction of plants and facilities both in and out of the continental United States. This policy assures the availability of competent men for every project and enables Fluor to retain a closely knit organization which may be expanded around a nucleus built up over a period of years. The soundness of the policy is evident in the high degree of loyalty of these men to the interests of both Fluor and its clients.

A MANUFACTURED PRODUCTS DIVISION—
an independent division—complete within itself

Fluor's Manufactured Products Division is a large, completely integrated organization devoted exclusively to the design, development and manufacture of natural draft and induced draft cooling towers, air-cooled heat exchangers, pulsation dampeners, mufflers, gas cleaners, and other special products. This division functions independently, with modern facilities strategically located on the West Coast and in the center of the United States. The highly specialized products manufactured by this division are recognized throughout the world for sound engineering, quality construction and guaranteed performance.

STRATEGICALLY LOCATED SALES AND SERVICE OFFICES—
close client contact—the ability to serve

Fluor's Sales and Service offices are so located and so staffed that continuing sales and technical contact can be maintained to meet customer requirements anywhere in the world. Fluor representatives are technical men with technical experience. They are qualified to give detailed information—to make decisions. These things are important when evaluating the abilities of a contractor to successfully perform difficult and complex projects involving engineering, construction and/or the supplying of special products.

FLUOR

Engineers - Constructors - Manufacturers

THE FLUOR CORPORATION, LTD. • LOS ANGELES • HOUSTON
New York, Chicago, Pittsburgh, Boston, Tulsa, San Francisco, Birmingham and Calgary

Represented in the Sterling areas by:
Head Wrightson Processes Ltd., Teesdale House, Baltic Street, London, E.C.1, England

SINCE 1890
BE *sure* WITH FLUOR

consider this OUTSTANDING ADVANTAGE of the famous WHELAND SWIVEL

WASH PIPE, special nickel alloy steel, carburized, precision machined, wearing surface heat treated to 700 Brinnell hardness, precision ground, polished and honed for maximum smoothness and minimum packing wear. Wash pipe outside diameters are precision machined in one operation assuring perfect concentricity and perfect alignment. No place to form pockets or restrict mud flow.
Wash pipes can be replaced with minimum time and effort. With just average care, the replacement goes in EASILY and in PERFECT ALIGNMENT.

ALSO IMPORTANT: Pressure lubricated, chevron type, controlled stack height, wash pipe packing in extra deep stuffing box. Free flexing packing lips provide positive mud seal. Triple lower grease seal. All packings permanently adjusted, pressure grease lubricated through readily accessible fittings.

All bearings have capacity in excess of Wheland's capacity ratings. Timken main load bearing with radial and thrust above and below to maintain perfect stem alignment. Upper thrust bearing, tapered cone. All bearings positively sealed off from mud and run in circulated, cooled oil. Large oil capacity.

Long radius gooseneck, streamlined manganese vanadium steel body, positive lower grease seal, special hold down construction, freedom from adjustments.

4 WHELAND SWIVEL SIZES

Model E-7000—Capacity 464,300 lbs. at 100 R.P.M.
Model E-6600—Capacity 350,000 lbs. at 100 R.P.M.
Model E-6200—Capacity 262,000 lbs. at 100 R.P.M.
Model E-6100—Capacity 130,000 lbs. at 100 R.P.M.

Bulletin No. 173 sent on request gives details, shows why more and more people are saying: "WHELAND has the best swivel on the Market."

WHELAND

THE WHELAND COMPANY, CHATTANOOGA, TENN., U. S. A.
ROTARY DRILLING MACHINERY

DRAWWORKS • SLUSH PUMPS
ROTARIES • CROWN BLOCKS
TRAVELING BLOCKS • SWIVELS

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Iverson Supply Co., Tulsa, Oklahoma • Lucey Products Corporation, Tulsa, Oklahoma • Superior Iron Works & Supply Co., Inc., Shreveport, Louisiana
EXPORT DISTRIBUTOR: Lucey Export Corporation, 233 Broadway, New York 7, New York — Broad Street House, London E. C. 2, England

IVERSON stores are strategically located to the oil fields. Store managers, field representatives and store personnel join in their desire to help you produce most at least cost, in drilling, production or refining. You'll find them a good group to get acquainted with for they are happiest when they can be of service to you.

OFFICES:
FORT WORTH
TEXAS

IVERSON SUPPLY COMPANY

DRILLING-PRODUCTION AND REFINERY EQUIPMENT
P.O. BOX 1439 TULSA 1, OKLA.

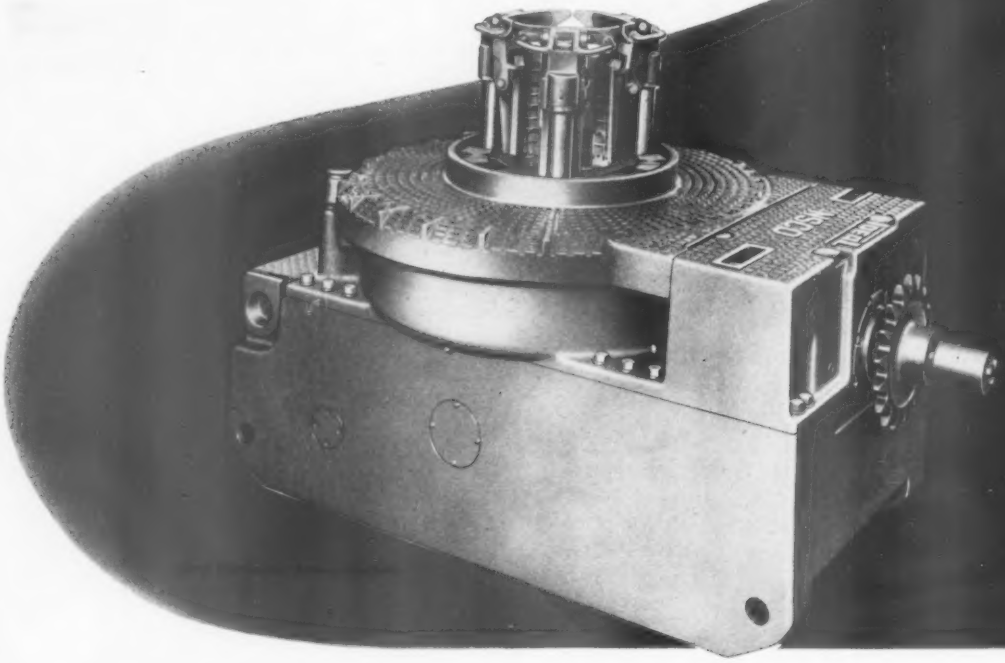
OFFICES:
MIDLAND
TEXAS

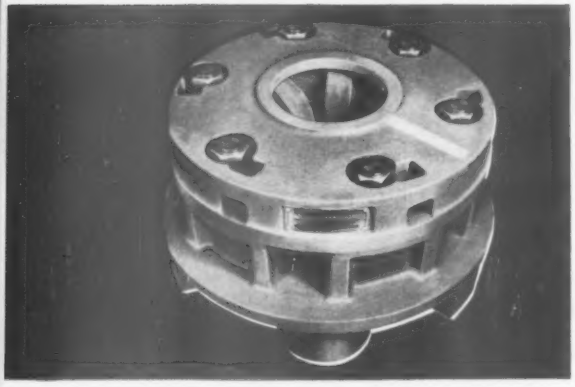
To Speed Up Drilling Operations,

To Cut Down Drilling Crew Fatigue,

To Run Drill Pipe or Casing Rapidly,

use IDEAL *MULTIMATIC ROTARIES*



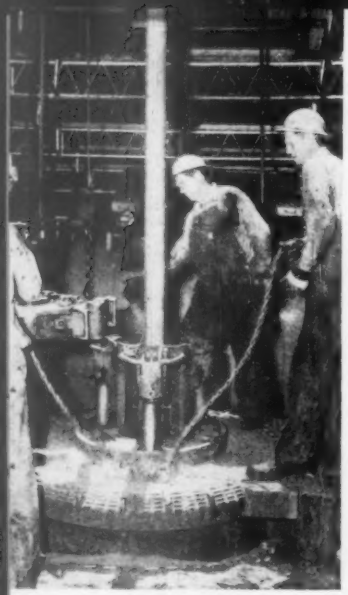


equipped with—

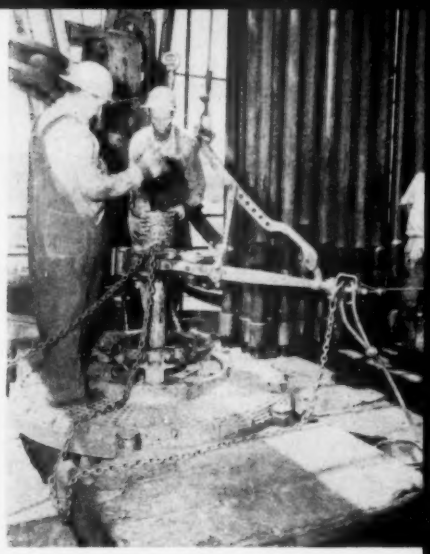
- **Air-actuated drill pipe and casing slips**
- **Fully-enclosed, built-in slip operating mechanism**
- **Direct-drive roller kelly bushing**
- **Positive seals against mud and water**
- **Non-skid-tread safety top**

After two years of experimental operation, and continuous research and development, the new "Ideal" Type 205 Multimatic Rotary has performed satisfactorily under every drilling test imposed upon it.

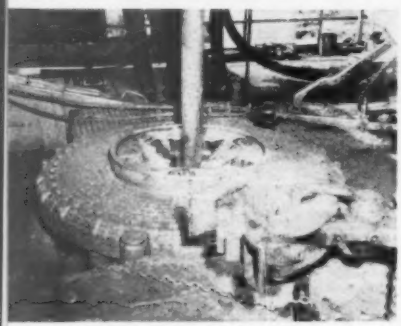
These field tests of the "Ideal" Multimatic Rotary were conducted in several parts of the United States in actual drilling operations. As a result, this sequence of operating photographs was made while the rotary was in service.



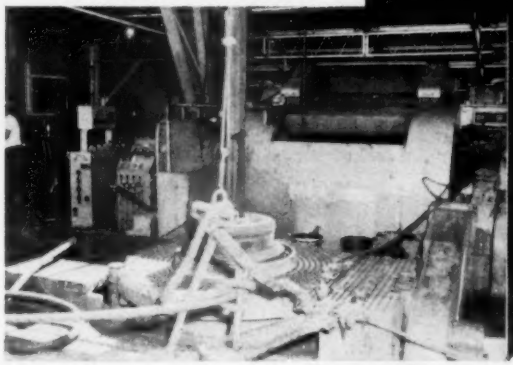
Slips retracted while drilling string is raised



Slips set, supporting drill pipe



Rotary machine with slips removed



Roller Kelly Bushing in place and rotary operating

Here are some of the important features of the "Ideal" Multimatic Rotary which increase the speed, safety, and ease of rig floor operations—

- **Air operation of slips which makes easier work for the crew**
- **Faster slip action which permits quicker round trips and faster casing jobs**
- **Rotary handles both drill pipe and casing, with quick changeover from one to the other**
- **Casing can be set without removal of rotary machine which saves time and labor**
- **Control equipment permits quick adaptability of the rotary to any rig practice or procedure**
- **Roller kelly bushing driven directly from table thereby eliminating table master bushing**

These and many other features and construction details will soon be available in bulletin form. Write now so that we can place your name on the list to receive a copy.

THE NATIONAL SUPPLY COMPANY

PITTSBURGH 30, PENNSYLVANIA

DIVISION OFFICES: Casper • Ft. Worth • Houston • Pittsburgh • Tulsa • Torrance
CANADA: The National Supply Company, Ltd., 702 Barron Bldg., 610 Eighth Ave., West, Calgary, Alberta
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NATIONAL BLUE PRODUCTS

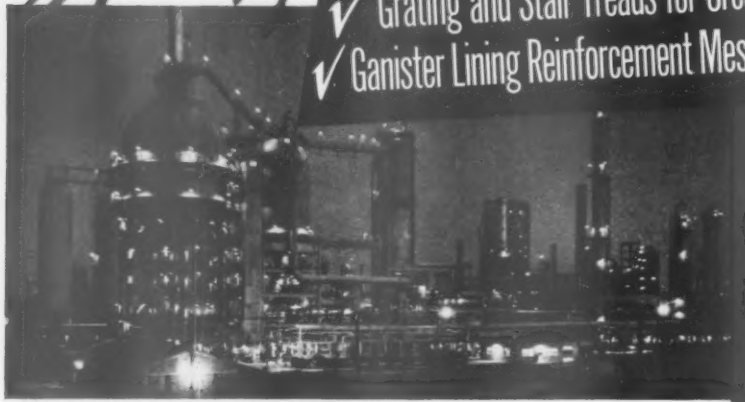
NATIONAL OIL FIELD MACHINERY AND EQUIPMENT

SPANG STEEL PIPE • SUPERIOR & ATLAS ENGINES

Specify KLEMP

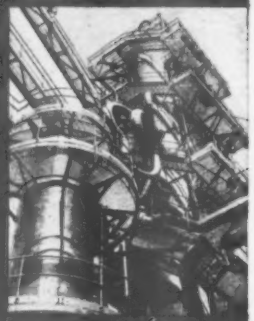
✓ Grating and Stair Treads for Greater Safety

✓ Ganister Lining Reinforcement Meshes for Longer Life



(Above) Thousands of square feet of KLEMP HEXTEEL installed in World's Biggest Catalytic Cracker Unit at this Giant Gulf Oil Refinery in Port Arthur, Texas.

(Below) DIAMOND RIVETED GRATING serves for strong, clean, non-slip, fireproof ventilated catwalks, mezzanines, stairways and platforms, prefabricated to your most exacting specification. Shown here is a Shell Oil Company installation.



(Above) GANISTER LINING REINFORCED with KLEMP HEXTEEL (shown being welded into a cat cracker) keeps CATALYST REGENERATORS ON LINE Longer. HEXTEEL, when applied, as a reinforcement mesh is filled with a cement filler. This reduces "turn-arounds" to a minimum and helps avoid scouring and abrasive actions of the catalyst which can quickly ruin cat crackers and thermal crackers.

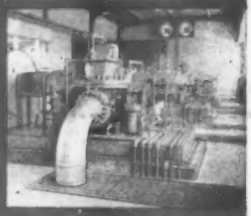
We Tread the World with Safety

The Klemp Metal Grating Corporation has been serving the needs of the Oil Companies for almost Half A Century. During this time Klemp has produced and patented several specialized gratings, such as HEXTEEL® and FLOORSTEEL® reinforcement meshes for use in fractionating vessels for the Oil, Chemical and Petro-Chemical industries.

KLEMP DIAMOND RIVETED and KLEMP KREST WELDED GRATINGS are consistently specified for stair treads, walkways, landings, tower stairs, catwalks, stairways and many other applications.

We are the only grating company to do all of our own work and we have complete fabricating facilities from complicated radial "set-ups", down to simple runs. Our engineers have spent a lifetime in this business and their specialized experience is at your service. We solicit the opportunity to solve your most difficult grating problems.

(Below) NEW KLEMP KREST* WELDED GRATINGS are made from special steel bars so formed to provide a peak or krest on the top side of the bar which gives this type of grating maximum non-slip characteristics. Ideal for structural foot walks as well as all other universal uses.



(Above) KLEMP FLOORSTEEL, because of its greater flexibility, is used to line the pipes leading to and from the catalyst regenerator. FLOORSTEEL is ideal for silencer stack units and also protects the narrow throat of the catalyst regenerator.

Write for Klemp's two new, free, fully illustrated technical catalogs, titled—

KLEMP 4 "Grates" serving the Nation's Major Oil Companies

KLEMP Open Steel Grating And Stair Treads

(Below) Klemp Manufactures Diamond Riveted, Welded and Serrated Stair Treads. This Serrated Tread has been developed especially for installations where unusual precautions are necessary to avoid accidents resulting from grease, mud, snow, etc.

*Trademark

Mr. Louis R. Turbeville
Consolidated Sales Agency
Dallas 2, Texas

Mr. W. V. C. Jackson
Tulsa, Oklahoma

Mr. H. L. Thompson
H. L. Thompson Co.
Houston, Texas

Mr. C. G. Ehlinger
Campbell Steel Co.
San Antonio, Texas

Mr. W. K. Ramsey
Ramsey Steel Company
El Paso, Texas

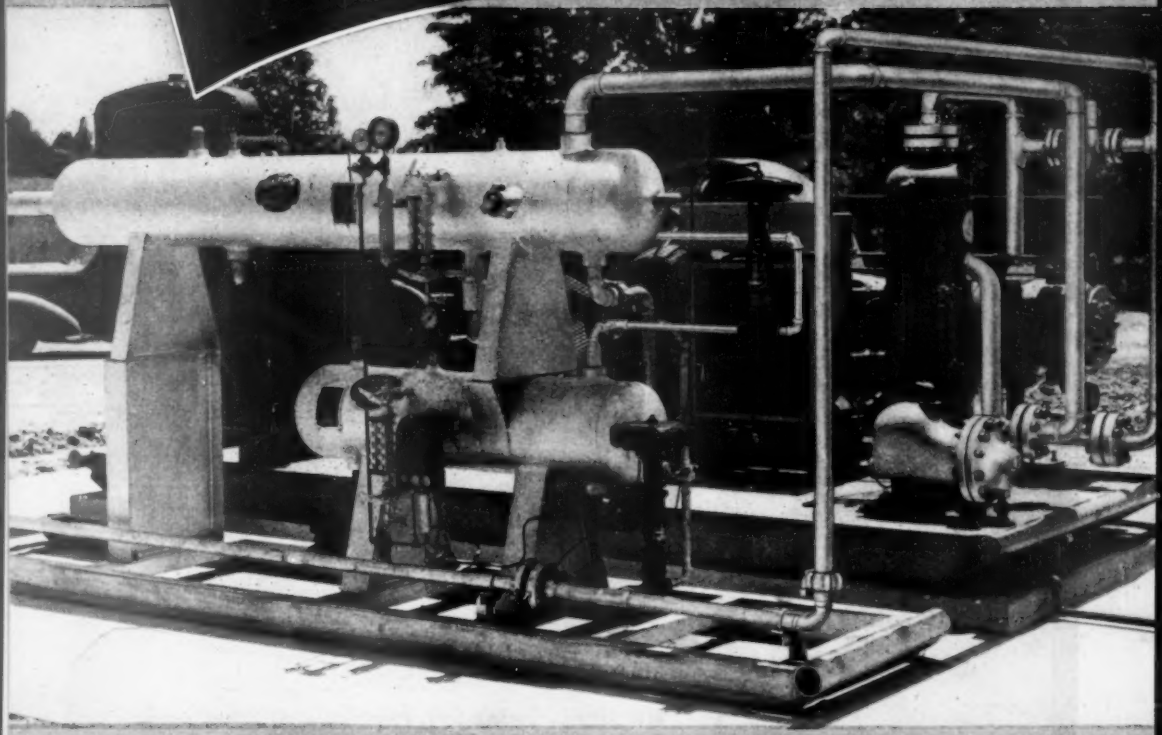
Mr. C. R. Ball
Ball & Black Supply Co.
Los Angeles 23, Calif.

KLEMP

KLEMP METAL GRATING CORPORATION

PARKERSBURG LIQUI-TRAP AND BY-PASS ASSEMBLY

for booster compressor stations



For the first time, the industry has a specially designed and completely unitized assembly for trapping and re-combining liquid at booster compressors. In addition to increased process efficiency, it has the advantage of flexibility, in that it can be supplied with a water knockout if desired . . . is available without main separator for use with your stock vertical or horizontal separators.

Removal and re-entrainment of liquid is accomplished by force of gravity, so that practically no compressor horsepower is wasted, as with mechanical or "pressure drop" by-pass systems.

Design of controls and arrangements of vessels is such that switching cycle time is reduced to a minimum, to provide maximum time for flow from separator to accumulator, and then back to the line.

For safety, exhausted gas charge from the accumulator is re-scrubbed, in main separator before re-entering compressor.

Ask your Parkersburg Representative about the Liqui-Trap and By-Pass Assembly and the new efficiency it brings to your booster compressors.

PARKERSBURG RIG & REEL COMPANY, Parkersburg, West Va.

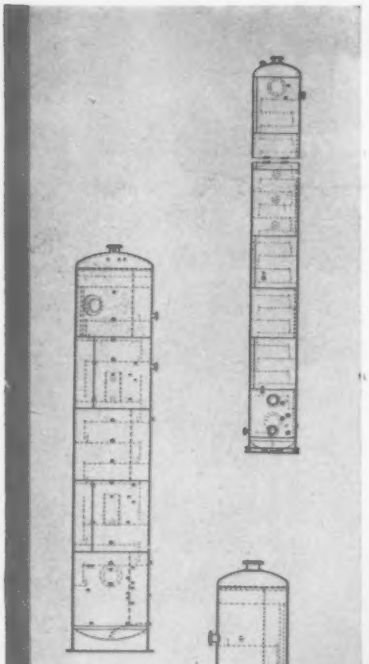
9313

PARKERSBURG

PRESSURE EQUIPMENT

HORIZONTAL AND VERTICAL SEPARATORS • HYRECO • HYDRACEPTER • SCRUBBERS • TREATERS • HEATERS

Manufactured in Houston, Texas



NATURAL GASOLINE PLANTS - Oil Refinery Equipment - Steel Plate Fabrication - Structural Steel - Warehouse Steel

FLINT STEEL CORPORATION

TULSA, OKLAHOMA

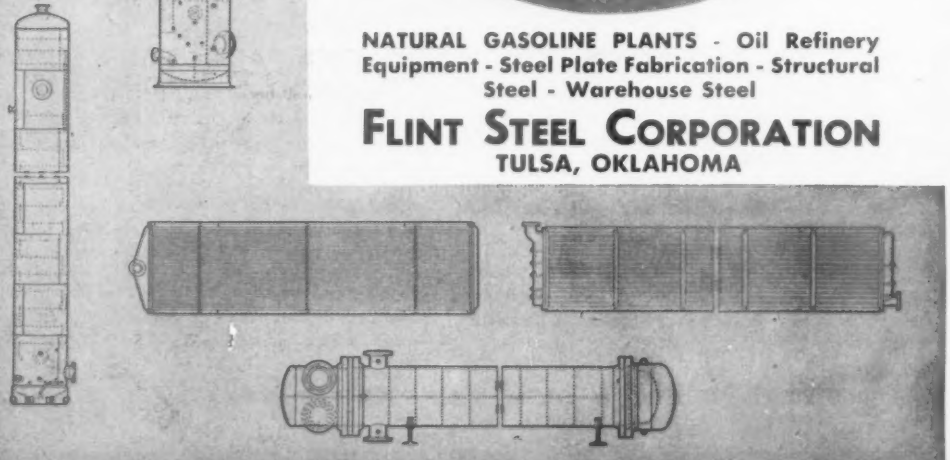


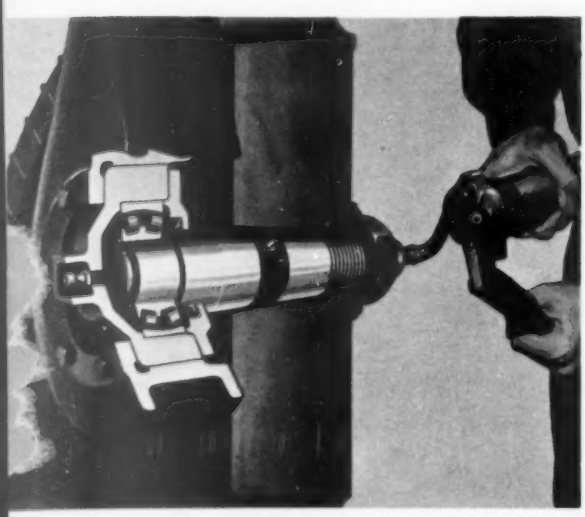
PLATE FABRICATING_____STRUCTURAL FABRICATING

REINFORCING FABRICATING_____WAREHOUSE PRODUCTS

3 ways you save with Emsco pumping units

1 The patented wing-type counterbalances on Emsco Pumping Units are designed so you can add auxiliary weights, as needed, to meet effective counterbalance range changes. This permits you to limit your auxiliary counterweight purchases to the immediate needs of your well. It also means that your engine is not required to turn over more weight—at any time—than accurate counterbalancing calls for.

2 Emsco's patented counterweights can be safely, quickly and easily adjusted by one man. No lifting or prying is required. A simple procedure enables your pumper—working at ground level—to accurately counterbalance your well without calling in outside help.



3 You can drop your sledge hammer and pick up the grease gun to remove wrist pins in the new Emsco Pumping Units. Two or three strokes of the grease gun handle furnishes all the hydraulic pressure required to unseat the wrist pin after the lock nut has been loosened. This saves time and eliminates sledge hammer damage to equipment.

EMSCO

CONTINENTAL

"SERVING THE OIL AND GAS INDUSTRIES"

THE CONTINENTAL SUPPLY COMPANY, General Offices: DALLAS, TEXAS

Export Div., The Continental Supply Co., Inc., 30 Rockefeller Plaza, New York, N.Y.
The Continental Supply Company, Limited, 316 Lancaster Bldg., Calgary, Alberta

Representatives: Argentina, Bolivia, Brazil, Chile, Colombia, England, Ecuador, Peru, Trinidad, Uruguay, Venezuela

E-123-F-52

Call CONTINENTAL for information about Emsco's full line of pumping units for shallow, medium and deep well pumping . . . known throughout the industry for their dependability and low-cost operation.

EMSCO DERRICK & EQUIPMENT COMPANY • Houston, Texas • LOS ANGELES, CALIFORNIA • Garland, Texas

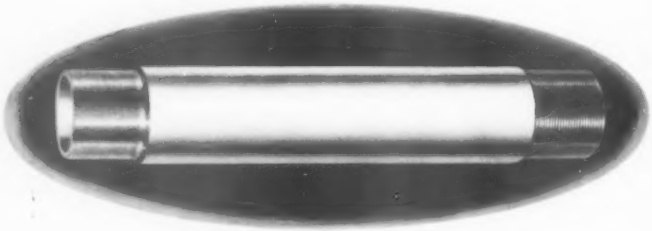
Pumps you can run any place ...D+B rod liner pumps

For sandy conditions... for corrosive conditions... for slant or crooked holes... D+B Rod Liner Pumps give assured, dependable performance.

D+B Rod Liner Pumps can be run at any practicable pumping depth and can be furnished for any stroke length.

The precision liners of D+B Rod Liner Pumps provide a true, accurate working surface for the plunger, resulting in longer runs and greater economy of operation, and lower repair costs.

Call your nearest D+B or CONTINENTAL store for service any time... anywhere. D+B and CONTINENTAL maintain sales and service facilities in virtually all major producing areas.



Converts your rod liner pump into a long stroke pump!

D+B Stainless Liner Collars have been developed to provide long liner pump assemblies for use with long stroke pumping units. These collars make it possible to join two or more conventional length liner jackets together to produce liner pump assemblies of any desired length.

The I.D. of the liner collar is precision bored and honed to the same exact tolerance of each liner in the pump assembly. The O.D. is threaded on both ends to fit the jackets.

D+B Liner Collars give added strength and rigidity to the liner pump assemblies. Each section of the liner jacket is properly preloaded to minimize the possibility of misalignment.

CONTINENTAL

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Representatives: Argentina, Bolivia, Brazil, Chile, Colombia, England, Ecuador, Peru, Trinidad, Uruguay, Venezuela

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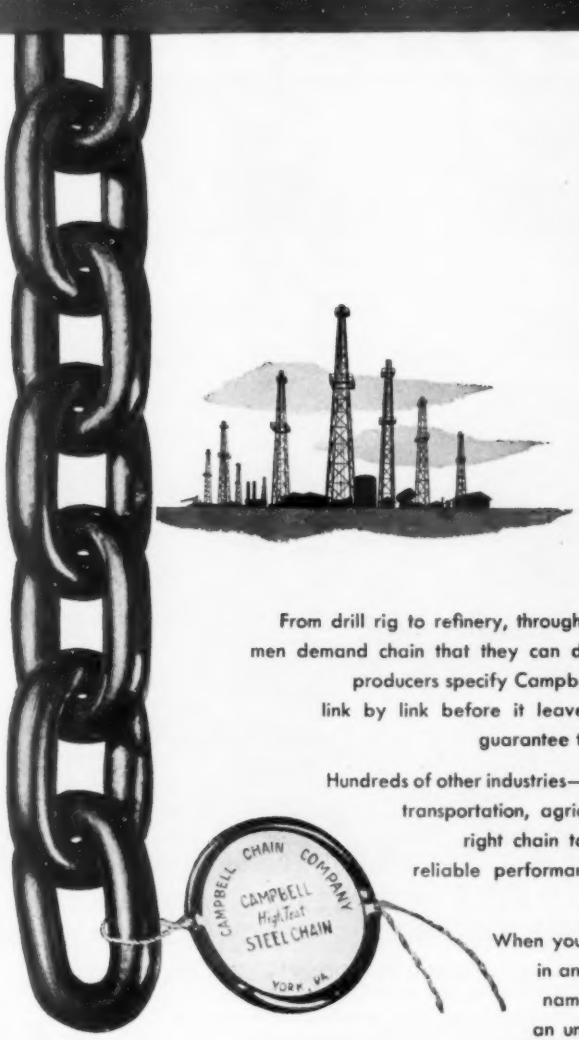
D+B DIVISION
EMSCO DERRICK & EQUIPMENT COMPANY

D+B

Garland, Texas • LOS ANGELES, CALIFORNIA • Houston, Texas

Oil men never take chain for granted!



From drill rig to refinery, through production and transportation, oil men demand chain that they can depend on. That's why leading oil producers specify Campbell Chain . . . chain that is inspected link by link before it leaves the factory. This is Campbell's guarantee that the chain is safe and sure.

Hundreds of other industries—among them mining, manufacturing, transportation, agriculture—look to Campbell for the right chain to fit their specific needs. Years of reliable performance have proved the long-lasting dependability of Campbell Chain.

When you need chain, for any purpose . . . in any grade, be sure to order it by the name—Campbell. Or, when you have an unusual problem involving chain, call the Campbell representative in your area. Take advantage of his experience.

Chain for every need . . . INDUSTRIAL . . . MARINE . . . FARM . . . AUTOMOTIVE

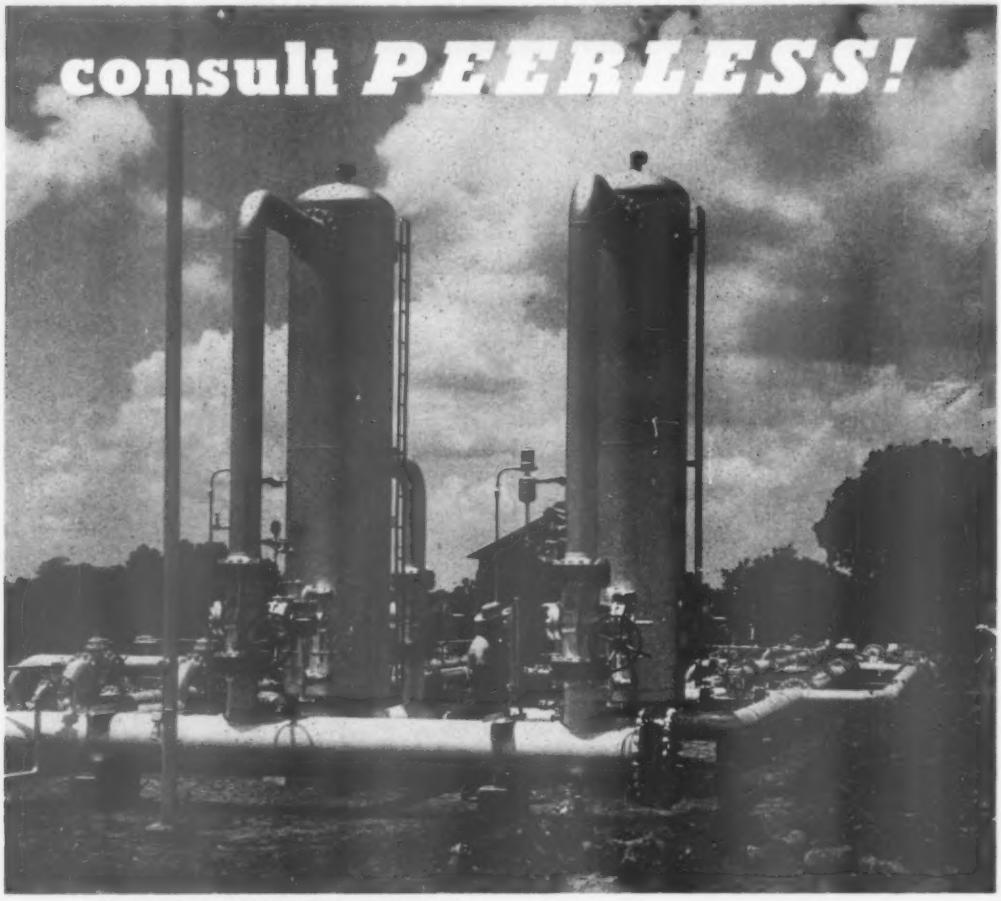
CAMPBELL CHAIN *Company*

MAIN OFFICE—YORK, PA. • *Factories*—York, Pa., and West Burlington, Iowa

CAMPBELL CHAIN

MAKERS OF FAMOUS CAMPBELL LUG-REINFORCED TIRE CHAINS

For GAS SCRUBBERS



The **BEST SCRUBBERS** for PIPELINES, GATHERING SYSTEMS, COMPRESSOR STATIONS, PLANT INLET SCRUBBERS

Pictured is an installation of TWO 42" x 15' Peerless Gas Scrubbers, at a new Pipeline Compressor Station, in Louisiana. This installation is typical of the many successful applications of Peerless Scrubbers.

Each Peerless Scrubber is designed and built around the famous Peerless Mist Extractor Unit, which guarantees the liquid entrainment loss to be less than 1/10 gallon per million standard cubic feet of flowing gas.

PEERLESS MFG. CO.

PEERLESS MANUFACTURING CO.

P. O. BOX 7193 ★ DALLAS, TEXAS ★ Dixon-8431

REPRESENTATIVES IN ALL PRINCIPAL CITIES

What one analysis gives you maximum tube life per dollar? Ask the experts!

This month's report is on: **SICROMO 3**

Has high degree of surface stability under oxidizing conditions up to 1200°F. Excellent oxidation resistance and good corrosion resistance. For use in cracking furnaces, heat exchangers, hot oil lines, superheaters, and for forgings and other parts exposed to oxidation or oil corrosion.

23 TIMKEN® STEELS FOR HIGH TEMPERATURE SERVICE

Carbon	Sicromo 2	Sicromo 5S	16-13-3
Carbon-Mo.	Sicromo 2½	Sicromo 5MS	25-20
DM-2	2¼% Cr.-1% Mo.	Sicromo 7	25-12
Silmo	Sicromo 3	Sicromo 9M	35-15*
DM	4-6% Cr.-Mo.	18-8 Stainless	16-25-6*
2% Cr.-Mo.	4-6% Cr.-Mo.-Ti.	18-8 Cb	

**Not available as seamless tubing at the present time.*

ONE and *only* one analysis of high temperature steel tubing can give you maximum tube life per dollar under a particular set of heat, pressure, corrosion and oxidation conditions.

The Timken Company's metallurgists are recognized authorities on high temperature steels. Backed by more than 20 years research and with 23 different analyses to choose from, they'll help you select the one steel that will give you the best life/cost ratio. And no matter which analysis you select, you can be sure of uniform quality, because the Timken Company controls quality from melt shop through final inspection.

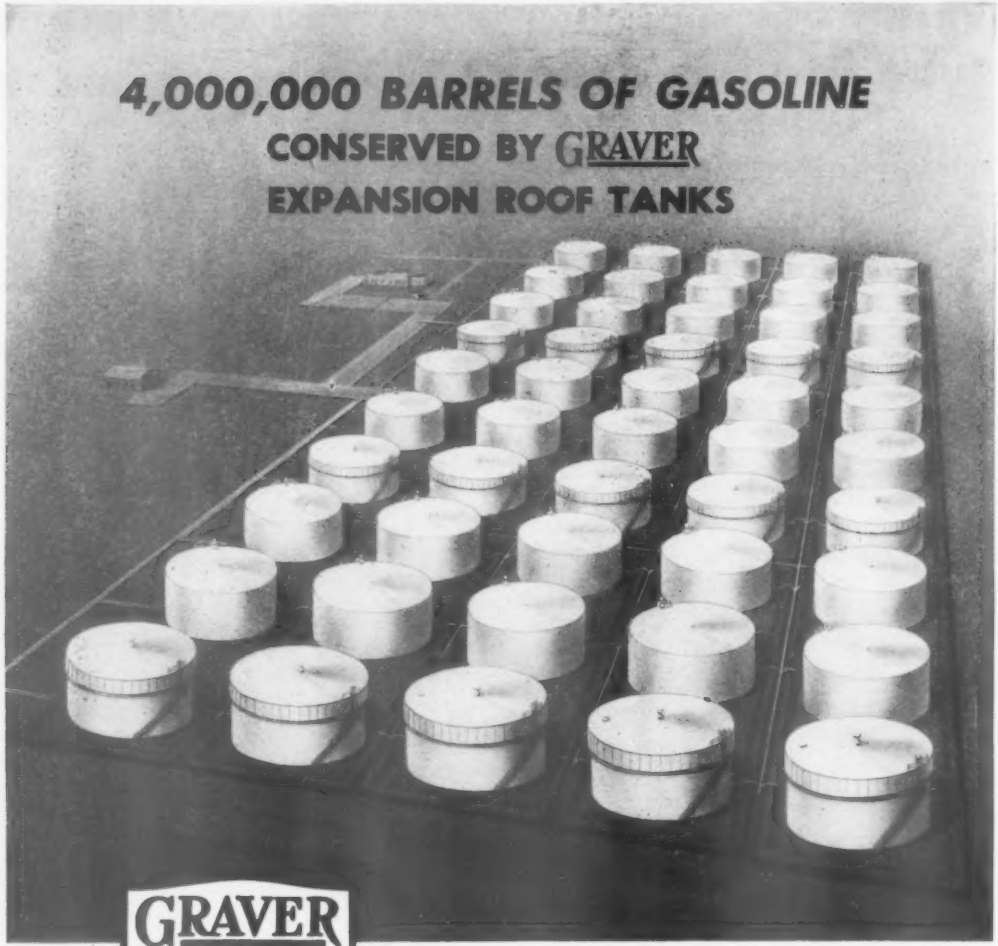
Let our "RSQ"—Research, Supply, Quality—solve your tube problems. *Ask the experts!* The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

Timken high temperature tubing must pass many rigid inspections. Pictured above is the cooling bed where powerful lights permit careful inspection of the inside surface of Timken high temperature tubing.

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING

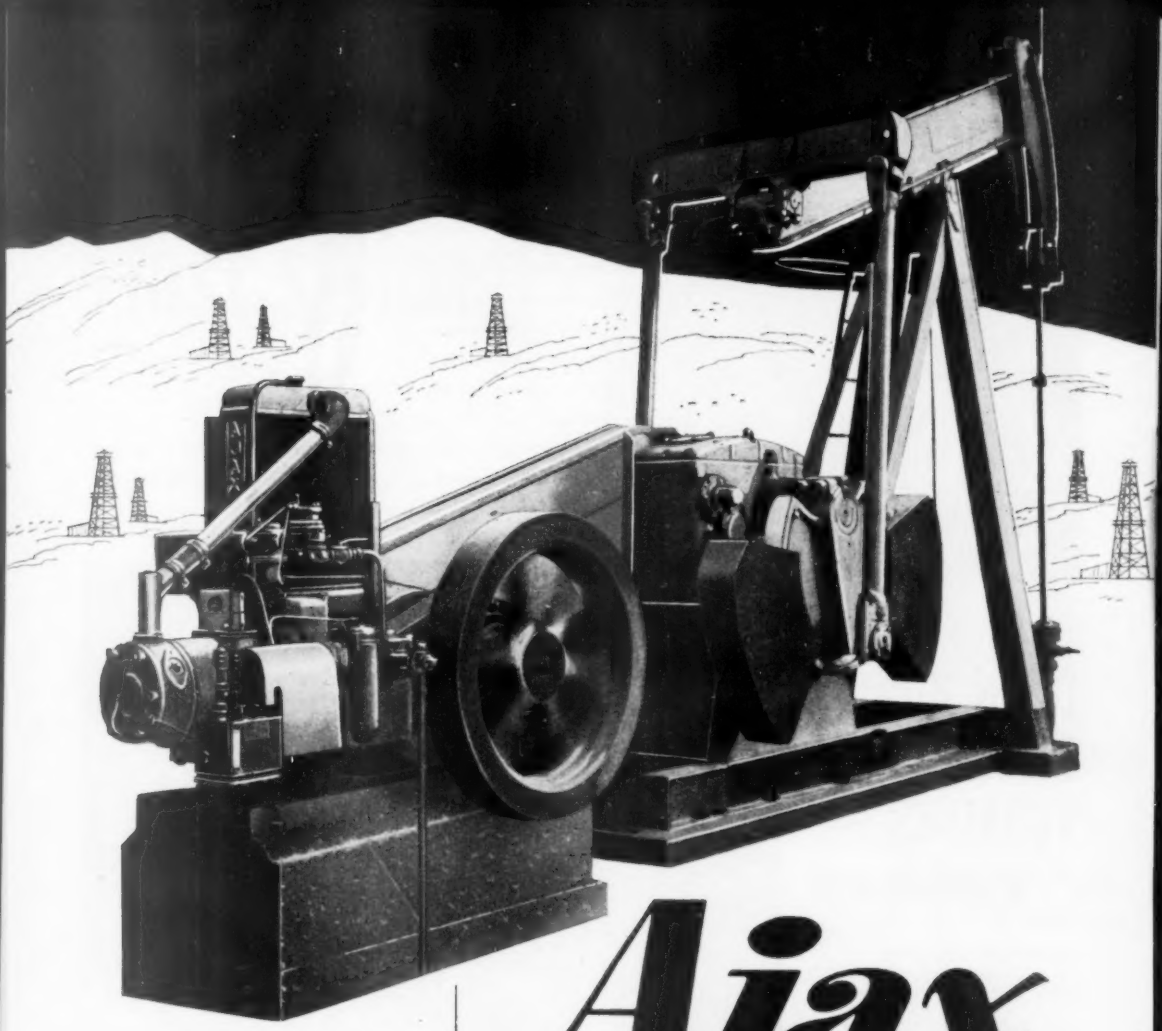
4,000,000 BARRELS OF GASOLINE
CONSERVED BY GRAVER
EXPANSION ROOF TANKS



GRAVER

This mammoth terminal of fifty 80,000-barrel tanks—rarely duplicated in any actual installation—represents the extraordinary record of product savings accomplished by the many Graver Expansion Roof systems throughout the country in the dozen years since the design was introduced to the petroleum industry. According to currently accepted evaporation loss factors, it is conservatively estimated that the Graver Expansion Roof has saved 168,000,000 gallons of gasoline—a gallon for every man, woman and child in the United States.

GRAVER TANK & MFG. CO., INC.
EAST CHICAGO, INDIANA
NEW YORK • CHICAGO • PHILADELPHIA • WASHINGTON
DETROIT • CLEVELAND • PITTSBURGH • HOUSTON
CATASAUQUA, PA. • SAND SPRINGS, OKLA. • CASPER, WYO.



Ajax LEADERSHIP

ON-THE-JOB!

LEADERSHIP 1877 1952 Ajax GAS AND OIL ENGINES

"BETTER GET AN Ajax"

There's one basic reason, above all others, why the experienced producer chooses AJAX: to get his wells pumped at the lowest *overall* cost for power.

That reason takes in everything AJAX has to give. That's why AJAX Engines *lead* wherever long-term cost requirements are most demanding. *Ask your Supply Man.*

AJAX IRON WORKS

Builders of Gas Engines • Steam Drilling Engines • Industrial Steam Engines

CORRY, PENNSYLVANIA

Oil Field Distributors: THE NATIONAL SUPPLY CO., PITTSBURGH, PA.

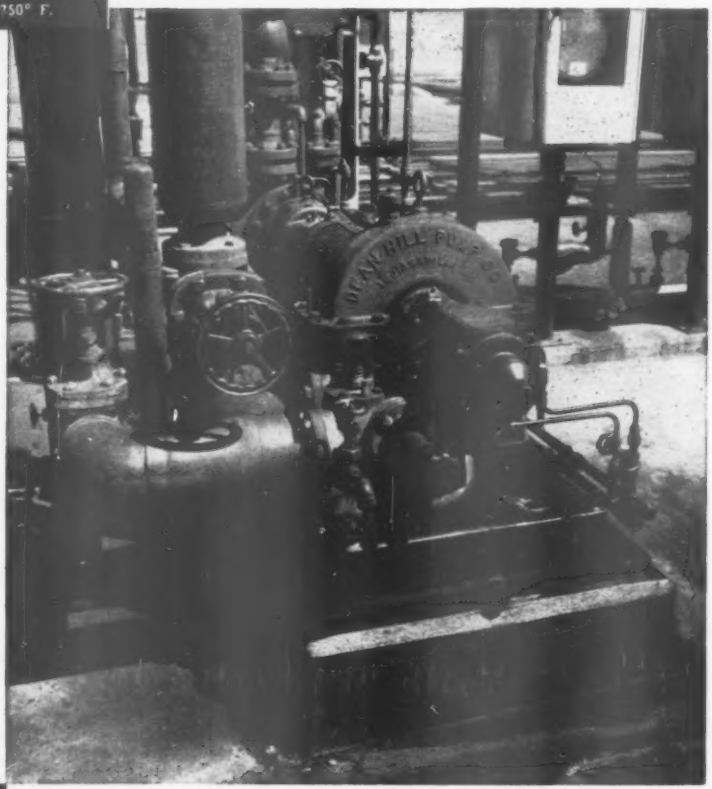
R. B. MOORE SUPPLY CO., BOLIVAR, N.Y. • BETHLEHEM SUPPLY CO., TULSA, OKLA.

Designed with the operator in mind!

No streamline housings.
No needless cover-ups.
Nothing fancy or frilly about these power-making huskies. Dean Hill Steam Turbines are designed and built for nothing but long service and easy, economical operation. Their heavy, rugged construction is simple and uncluttered for quick, easy maintenance. All pressure parts are outside and visible to operator.

DEAN HILL STEAM TURBINES

.....are single stage, double impact type for low steam consumption. Specifically designed for operation at medium steam pressures and temperatures, DH Turbines have all the advantages available under these conditions, including excellent water rates. Write us for further information and complete specifications.



One of eighty-four Dean Hill Steam Turbines recently installed in a large, eastern Refinery

DEAN HILL PUMP COMPANY

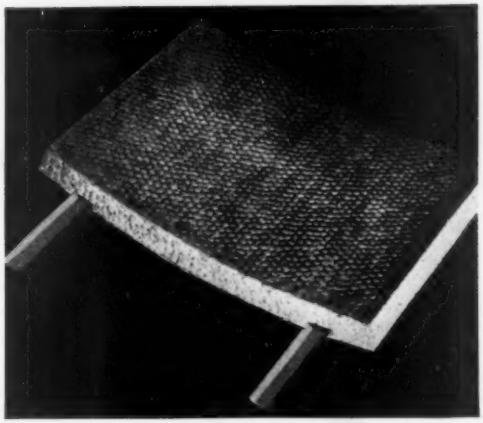
Pump and Turbine Engineers Since 1895

INDIANAPOLIS 7, INDIANA

SALES OFFICES IN:

Chicago • Mexico City • Philadelphia • Salt Lake City • New York • Dallas • New Orleans • San Francisco • Denver • Los Angeles • Pittsburgh • Houston • St. Paul • Cleveland

"Never knew blocks could last so long!"



RAY-MAN 635-D BRAKE BLOCKS

In several of the nation's most active fields, Ray-Man 635-D Brake Blocks are making exceptional records for durability, even when handling the heaviest strings of pipe.

This durability means *lower costs*. In addition, Ray-Man 635-D Blocks feed off so smoothly and evenly that they speed drilling operations.

Each Ray-Man 635-D Block is woven of unusually large asbestos yarns. Strengthened with brass-wire-reinforced yarn in back. Fully impregnated with a specially developed saturant. Resists bleeding at high temperatures. Won't glaze drums. Won't carbonize even when heavily overloaded!

Key-Lok attachment, too! Key-Lok, the R/M development that makes it possible to *slide* blocks on and off, is optional with Ray-Man 635-D Blocks. This feature saves relining time . . . eliminates bolt holes, providing greater friction surface and longer wear. No danger of scoring drums with bolt heads. Also available drilled and countersunk for bolt attachment.

RAYBESTOS-MANHATTAN, INC.

WAREHOUSE STOCK: 2809 Taylor Street, Dallas, Tex.

OFFICES:

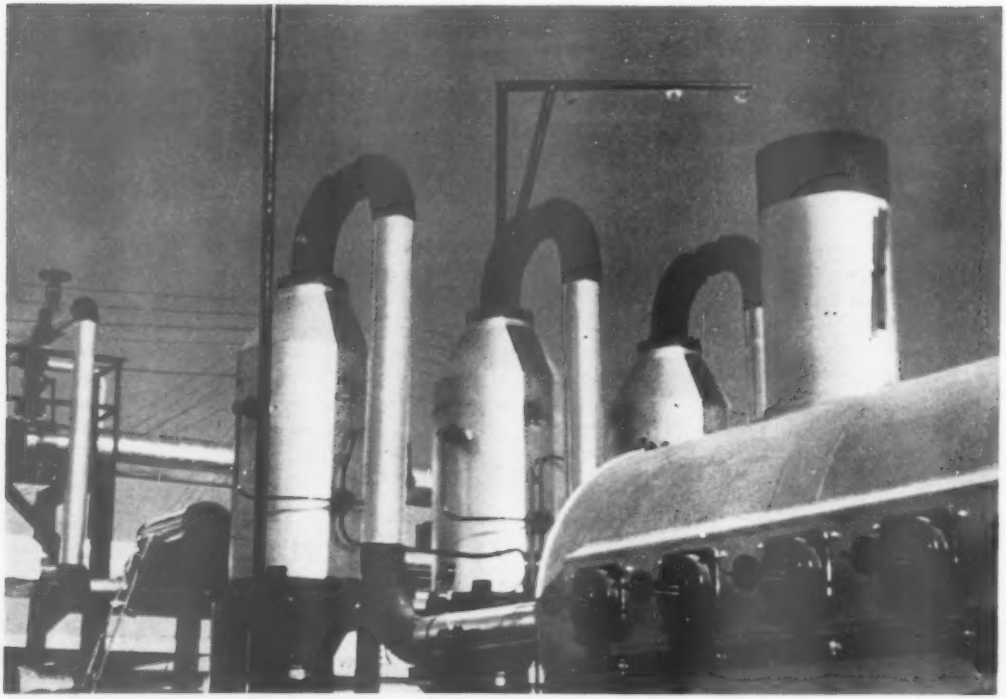
445 Lake Shore Drive, Chicago 11, Ill. • 4651 Pacific Blvd., Los Angeles 11, Calif.

Factories: **Bridgeport, Conn. • Manheim, Pa. • Passaic, N.J. • No. Charleston, S.C. • Crawfordsville, Ind. Peterborough, Ontario, Canada**

RAYBESTOS-MANHATTAN, INC., Manufacturers of Brake Linings • Brake Blocks • Clutch Facings • Radiator Hose • Fan Belts • Mechanical Rubber Products • Rubber Covered Equipment • Packings • Asbestos Textiles • Sintered Metal Products • Abrasive and Diamond Wheels • Bowling Balls

CATFORMING...

the Atlantic catalytic reforming process



McBride Refining's Catforming unit at La Blanca, Texas

...the refiner's solution to high octane requirements with low operating and investment costs.

For two years, frequent notices in trade journals and the public press have been giving you advance news on the Catforming process by The Atlantic Refining Company. Now, successful commercial operation is under way.

it's the catalyst that counts

Since catalytic reforming was first utilized, numerous processes have been introduced to increase its benefits. None of these completely satisfied our requirements. So we looked for the answer in the catalyst itself.

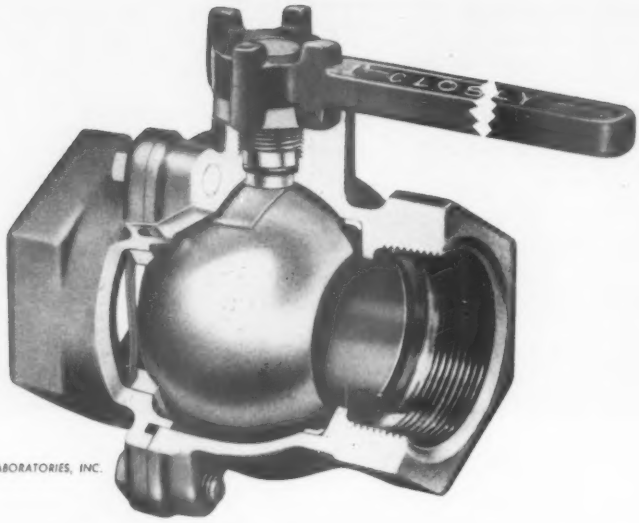
years of research

Years of continuous laboratory study were devoted to the problem . . . in a search for a new catalyst with superior qualities. This extensive research paid off in a completely new catalyst which is the heart of Catforming. This catalyst combines improved selectivity, greater stability, excellent resistance to poisoning, and ease of regeneration.

now in commercial operation

Catforming is now in successful commercial operation. It is giving exceptional results. Our engineers are ready to give you the whole story. Call or write The Atlantic Refining Company, Research and Development Dept., P. O. Box 8138, Philadelphia 1, Pa. (Telephone, HOward 5-2345).

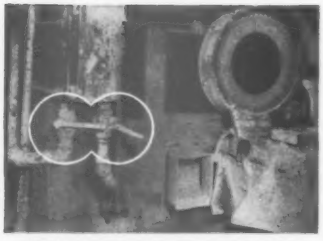
ATLANTIC



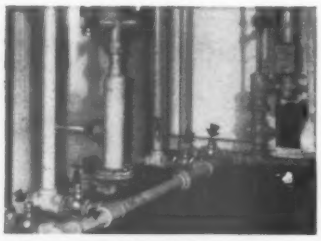
TESTED BY UNDERWRITERS' LABORATORIES, INC.

Breaking Records Throughout Industry!

FOR LONG LIFE . . . FOR ECONOMY . . . FOR SAFETY



Leading glass manufacturer reports Rockwood Ball Valves, operated 1500 times a day in a mixing process, *were only valves to stay in service over a year.*



Maintenance engineer of large gas company says: "Easy operation and no maintenance cost make Rockwood Ball Valves *far ahead of any others we have used.*"

On Texas transport firm's fleet of propane-butane trucks, the leakproof construction of Rockwood Ball Valves make them *safest for handling inflammable gases.*

Here's why Rockwood Ball Valves give you more of what you want in valve performance:

FULL ROUND FLOW . . . no change in shape or volume of the fluid stream . . . no turbulence . . . minimum friction loss.

QUICK OPENING AND CLOSING . . . needs only a quarter turn, even under full pressure.

RESISTS WEAR LONGER . . . scratching, pitting and abrasion have little effect on the chrome-plated, floating bronze ball.

STAYS LEAKPROOF . . . in closed position, pressure of fluid automatically positions ball against synthetic rubber seat to form a tight seal.

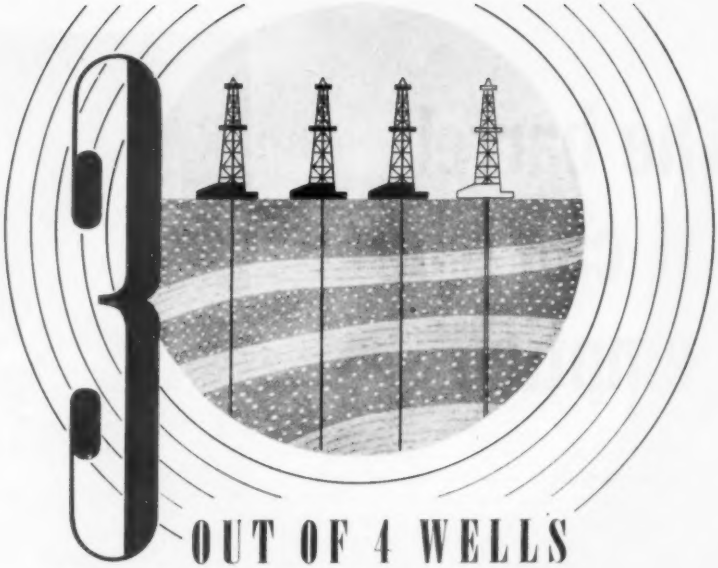
It will pay you to investigate how these advantages can benefit your own applications. Send for bulletin. Rockwood Sprinkler Company, 104 Harlow Street, Worcester 5, Mass. Distributors in all principal cities.

Some Prominent Users

Libby-Owens-Ford Glass Co.
Revere Copper & Brass, Inc.
Bird Machine Co.
Remington Rand, Inc.
Hub Machine Co.
Daggett Chocolate Co.
Also approved by Und. Lab. for L. P. G.

ROCKWOOD *FULL-FLOW* BALL VALVES

THE FLOW IS AS ROUND AS THE PIPE ITSELF



3 OUT OF 4 WELLS PRODUCED MORE OIL with HALLIBURTON'S HYDRAFRAC SERVICE!

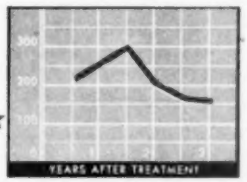
Periodic surveys on Hydrafrac treated wells show that three of every four responded with production increases. The latest report was compiled from records of 240 formations in 192 counties of 16 states.

A previous survey on 25 of the first wells Hydrafrac treated showed a two-year average sustained increase of 200% more than pre-Hydrafrac production!

Now over 13,000 Hydrafrac treatments... This number is growing rapidly with the procedure being employed more and more as a well completion practice. Performed with spectacular success in many fields, Hydrafrac Service is backed by practical experience and the accumulation of important and extensive data exclusively in the hands of Halliburton personnel.

This Halliburton service is ready to analyze your well without obligation before recommending for or against Hydrafrac application. May we assist you in your production improvement program? Contact your nearby Halliburton Representative now. Or write Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

PERCENT OF INCREASED PRODUCTION FOLLOWING HYDRAFRAC TREATMENT



HALLIBURTON

YEARS AHEAD IN PRODUCTION IMPROVEMENT TECHNIQUES!

The barrel that can't be emptied

Many a man can remember reading by kerosene lamp. For however fast time speeds by, it hasn't been very long since lamps played an important part in lighting the homes of the West and Standard was a small company proud of its ability to get from 5 to 10 gallons of its principal product, "coal oil," from a barrel of petroleum.

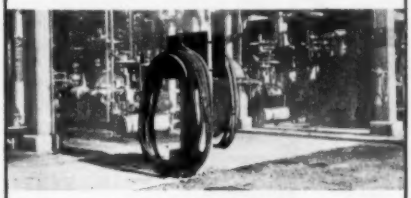
Count a few of the products made from oil today! Almost every item pictured above comes directly or indirectly from oil: (1) the enamel on stove, refrigerator and cabinets, (2) the dryer in the wall paint, (3) the plastic in the clock cover, curtains, apron, (4) the linoleum, (5) the drainboard covering at the sink, (6) the detergents used in washing—(7) the finish on the car and (8) the synthetic rubber of its tires. ¶ Add to these asphalt for paving and roofing, insecticides, cosmetics, dry cleaning solvents...and, of course, steadily improving gasolines and motor oils...and you begin to see how important oil has become. ¶ More than 1100 products are now being made from petroleum by Standard, and others are on the way. We have spent $35,000,000 in research and technical service in the last 5 years alone...to make a barrel of oil truly "a barrel that can't be emptied" in terms of the good things it contributes to your daily living.

STANDARD OIL COMPANY OF CALIFORNIA ***plans ahead to serve you better***

How many chores does U. S. Rubber's hose perform?

Loading Bunker oil, Ethyl gasoline and regular gasoline through U. S. Rubber's Amazon Dock Hose.

Pumper trailer with U. S. Rubber's neoprene-covered fire hose. Capacity is 500 gallons per minute.



U. S. Matchless® Steam Hose on a typical hose rack in a refinery.

Here are but a few examples of the many installations where "U. S." hose is working daily on the docks and throughout the entire refinery. You'll find it transporting oil, gasoline, washing down, thawing out, dissipating volatile gases. You'll find it ready to fight fires and perform many other special jobs... in fact, there is a "U. S." hose for every refinery need. Refinery men know that United States Rubber Company hose always exceeds the standards of safety boards and protective statutes. For complete hose information, write to address below.

PRODUCT OF U.S.RUBBER SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

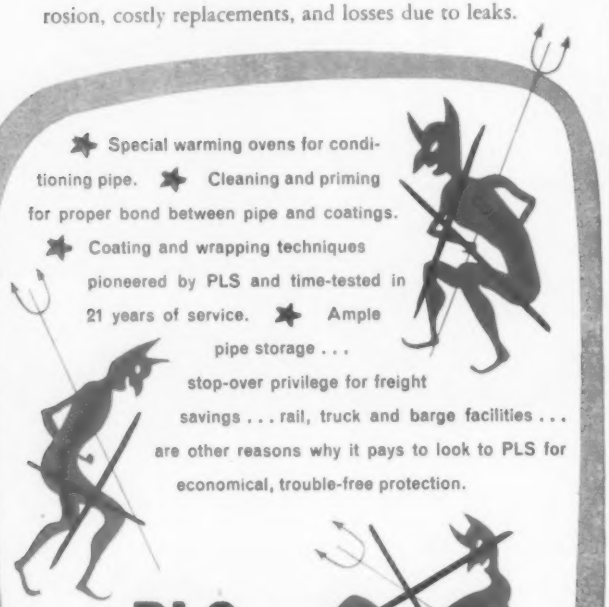
MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

HOW **PLS**

Controlled Protection

HELPS YOU BANISH HAZARDS OF DESTRUCTION

Every step of the protection process at PLS is designed to free steel pipe users from destructive corrosion, costly replacements, and losses due to leaks.



★ Special warming ovens for conditioning pipe. ★ Cleaning and priming for proper bond between pipe and coatings. ★ Coating and wrapping techniques pioneered by PLS and time-tested in 21 years of service. ★ Ample pipe storage . . . stop-over privilege for freight savings . . . rail, truck and barge facilities . . . are other reasons why it pays to look to PLS for economical, trouble-free protection.

PLS

PIPE LINE SERVICE CORPORATION

Pioneers in Steel Pipe Protection

General Office and Plant: Franklin Park, Illinois

Plants at Glenwillard, Penna.; Longview, Texas; Corpus Christi, Texas; Harvey, La.; Sparrows Point, Md.

21 Years of Dependable Service

They Say—

Hidden Industry

"Gigantic as the oil business is, it is hard to observe it. Its gears mesh so smoothly and quietly the public hardly notices it at all.

"Filling up the auto tank at a service station is about as easy an operation as flicking the switch in a dark room and getting a flood of light. But if a motorist will backtrack along the steps taken to put the motor fuel at his call, he'll take in some sights . . .

"Little of this operation is on view. It's a quiet business from start to finish. One must get close to a flowing well to hear it gurgle, and few people indeed ever get to see crude petroleum . . ."

Editorial in the Tulsa Tribune.

Workers CAN Run Business

"Marx argued that workers would never be free until they, themselves, owned the facilities of production. He declared that they could only acquire this ownership through revolution. . .

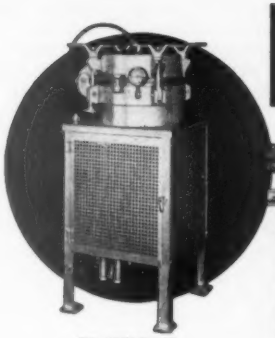
"The workers in Russia had their revolution, but they do not own the tools of production. . . Then the workers in England had their revolution, too . . . a quiet little revolution which was fought with ballots instead of bullets, but which placed Labor in absolute control of the government for 6 years. . . But still the men who worked in the coal mines, in the steel mills, and on the railroads did not own the tools of production.

"The truth is that here in America we have real and direct public ownership of our biggest and most important industries. That ownership is sold daily, in little pieces, on the stock market. If the workers of this country truly wish to own the tools of production, they can do so very simply.

"All in the world they have to do is to buy, in the open market, the capital stock of the corporation they want to own—just as millions of other Americans have been doing for many decades.

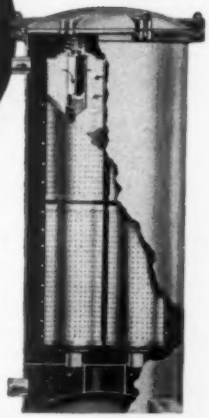
"The fact remains that, at today's market prices, the employes of U. S. Steel could buy every share of the outstanding common stock of the corporation just as easily and just as cheaply as they can purchase a moderately good automobile.

"By investing $10 a week—which is about what our steelworkers gained in the recent wage increase—the em-



OIL RECLAIMER

HILCO LUBE and FUEL OIL PURIFICATION - - -



FILTER

15 YEARS CONTINUOUS OPERATION WITHOUT OIL CHANGE IN DIESEL AND GAS ENGINES—NEGLIGIBLE PISTON AND CYLINDER WEAR.

THIS IS THE RESULT OF COMPLETE PURIFICATION—THE REMOVAL OF SLUDGE, CARBON, ACIDS, WATER, AND FUEL DILUTION.

HILCO UNITS IN OPERATION LONG ENOUGH TO PROVE THEIR VALUE. ONE-QUARTER CENTURY OF EXPERIENCE IS AT YOUR SERVICE.

- PURIFIERS
- FILTERS
- RECLAIMERS
- CONDITIONERS

THERE IS A HILCO FOR EVERY LUBRICATION AND FUEL OIL FILTERING PROBLEM - - -

YOU WANT CLEAN OIL AND CLEAN ENGINES TO SAVE EQUIPMENT—OIL AND MONEY—INVESTIGATE HILCO OIL MAINTENANCE METHODS.

★ **WRITE FOR FREE LITERATURE - - NO OBLIGATION**

THE HILLIARD CORPORATION, 23 W. FOURTH STREET, ELMIRA, N. Y.

IN CANADA—UPTON-BRADEEN-JAMES, LTD., 990 BAY STREET, TORONTO, 3464 PARK AVE., MONTREAL

MAKE YOUR OLD PIPE LINE LIKE NEW... WITHOUT APPRECIABLY DISTURBING SERVICE!

Typical pipe line *before* Pipe Linings treatment

Old line *after* reconditioning by Pipe Linings, Inc.

INCREASE CAPACITY...CUT COSTS

You can get new pipe line performance from old cast iron or steel pipe line economically and easily.

No need for major interruption to present service . . . no need to buy expensive, hard-to-get new pipe.

Patented equipment used by Pipe Linings, Inc. removes all tuberculation and incrustation from the interior of old pipe lines...applies a new continuous, smooth-surface cement mortar lining...*with only momentary interruption to install by-pass lines.*

So . . . why not get new line performance from *your* old pipe line at much less than the cost of new pipe? Write for full information TODAY!

Cement Mortar Lining of Old Pipe Offers These ADVANTAGES...

- Protects against discoloration and contamination
- Protects against corrosion
- Improves flow coefficients
- Prevents leakage
- Reduces maintenance costs
- Reduces pumping costs

TATE PROCESS USED on Line 4" to 16"

CENTRILINE PROCESS Used on Line 16" to 144"

Consult our hydraulic engineers...they are at your service

PIPE LININGS, Inc.

A subsidiary of
American Pipe and Construction Co.
4675 Firestone Blvd.
South Gate, California
(In the East—CENTRILINE CORP., 140 Cedar St., New York 6, N.Y.)

PIPE LININGS, INC.
4675 Firestone Blvd., South Gate, Calif.
Please send complete information on how we can obtain new pipe line performance from our old line.

Name_____ Title_____

Company_____

Address_____

City_____ Zone___ State_____

Preferred power on portable conveyors for economically moving bulk materials! These are the world's most widely used single-cylinder gasoline engines on hundreds of kinds and types of machines, tools and appliances. They are preferred by industry, construction, railroads, oil fields, and on equipment for farms and farm homes.

WHEREVER you find gasoline powered equipment doing the job better, faster — invariably the power is Briggs & Stratton. These single-cylinder, 4-cycle, air-cooled gasoline engines are leaders in the field and preferred for dependable power the world over. Briggs & Stratton Corporation, Milwaukee 1, Wisconsin, U. S. A.

In the automotive field Briggs & Stratton is the recognized leader and world's largest producer of locks, keys and related equipment.

ployes of U. S. Steel could buy all of the outstanding common stock in less than 7 years. . . But in order to control U. S. Steel, these workers would not even have to purchase 87 shares apiece. Sixty-two shares of common stock would give them a voting majority in the corporation's affairs. That would cost them less than $2,500 at the present market: and an investment of only $5 a week would turn the trick in less than 10 years. Then they could elect their own board of directors, fire the present management, put Phil Murray in my job, if they wished, and run the business to suit themselves."

Benjamin F. Fairless, president, United States Steel Corp., addressing the annual meeting of the Pennsylvania State Chamber of Commerce, Pittsburgh.

A Political Philosophy

"The administration's propaganda, in and out of court, in support of its claims has been so incessant and admonitory as too create the impression that there is something of a sinister nature in the effort to confirm state title to these lands, title that was not questioned by Washington for a hundred years and only was assailed when the petroleum yield and the prospect of more became valuable.

"But the fact is that Eisenhower's position has a large share of history, law and common sense behind it, and, in the instances of Texas, public morals, too. Moreover, it is an expression of his political philosophy that the encroachment of the federal Government on the rights and property of the states has been proceeding at a gallop under the New-Fair Deal; that it must be stopped; and that this is the place to stop it.

"Stevenson also has shown concern over federal encroachment. But he finally concluded that this is not an example of it and should therefore be sustained."

Arthur Krock, writing in the New York Times.

Baku's Oil

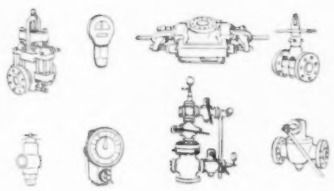
"Russia's historic Baku oil fields have come into the news again with the recent revelation that a significant and increasing portion of this area's petroleum output is now coming from underwater wells in the Caspian Sea.

"Since the location and drilling of such underwater oil wells is even more difficult than the establishment of wells under dry land, it seems clear that the Soviet Union has been forced to push out under the Caspian because the older Baku oil areas are showing signs of exhaustion after more than a half century's intensive exploitation.

Billion dollar blowout

It happened at Hull, Texas, in 1922. A young contractor by the name of *Jim Abercrombie* was re-working a well when it blew out and caught fire. As he watched his hard-won equipment being destroyed, he resolved to do something about this menace that had begun to stalk the struggling young oil industry. Soon, from his newly acquired "repair shop" . . . *Cameron Iron Works* . . . came the first crude model of a ram-type blowout preventer. This was the grand-daddy of the now famous pressure-operated Cameron Blowout Preventers which have become a byword in the oil fields. Their savings to the industry are already inestimable . . . *perhaps a billion dollars or more* . . . considering the valuable reservoir pressures, costly well bores and machinery and the conservation of tremendous quantities of oil and gas. So, an event which might have passed as just another blowout in the roaring twenties actually sparked the development of the Cameron line of drilling and completion control equipment that is now regarded as the standard of comparison the world over.

Cameron



C.I.W., Inc., P. O. Box 1212, Houston, Texas Export: 7912 Empire State Bldg., New York, N. Y.

Service

TO THIS AREA'S NUMBER 1 INDUSTRY

Second National's Oil and Gas Division is staffed by petroleum engineers who are up-to-the-minute on oil and gas developments and understand the problems of the industry.

Located at world headquarters of the oil and gas industry, this bank has become, through the years, a major factor in financial service to this important segment of our economy. You'll find it helpful to consult us on your problems.

45 Years of Service to the Southwest

The **SECOND NATIONAL BANK OF HOUSTON**

MAIN AT RUSK

CAPITAL AND SURPLUS 15 MILLION DOLLARS

Member Federal Deposit Insurance Corporation

"But whatever the production situation at Baku may be, one major point about this area deserves always to be borne in mind. Baku belongs to the Soviet Union because Czarist Russia conquered the Azerbaijani people, a Moslem group closely related to the population of Iran.

The Moslem leaders in the Near East who are today so incensed by "British imperialism" or "American imperialism" will do well to study the history of Baku and its Russian exploitation. Against that history the record of the Anglo-Iranian Oil Co. or other western oil enterprises in the Moslem world falls into proper perspective."

Editorial in the New York Times.

CALENDAR

NOV.

18-13 American Petroleum Institute, thirty-second annual meeting, Conrad Hilton Hotel and Palmer House, Chicago.

13-14 Society of Exploration Geophysicists, midwestern meeting, Texas Hotel, Fort Worth.

17-18 American Institute of Electrical Engineers, subcommittee on electrically operated recording and controlling instruments, technical conference, Benjamin Franklin Hotel, Philadelphia.

20-21 National Association of Corrosion Engineers, western region, second annual corrosion conference, Biltmore Hotel, Los Angeles.

20-22 Instrument Maintenance Short Course, jointly sponsored by Southern California Meter Association and Los Angeles Harbor Junior College.

21 Natural Gasoline Association of America, district meeting, Herring Hotel, Amarillo, Tex.

30-Dec. 5 American Society of Mechanical Engineers, Statler Hotel, New York City.

DEC.

1- 3 New Mexico Oil and Gas Association, annual meeting, Albuquerque.

1-6 American Society of Mechanical Engineers, twentieth National Exposition of Power and Mechanical Engineering, Grand Central Palace, New York.

4- 6 American Chemical Society, southwest regional meeting, Little Rock, Ark.

5- 6 Interstate Oil Compact Commission, winter meeting, Wichita, Kans.

7-10 American Institute of Chemical Engineers, annual meeting, Hotel Cleveland (Hqs.) and Carter Hotel, Cleveland.

1953

JAN.

19-22 Plant Maintenance Conference, Public Auditorium, Cleveland.

FEB.

2- 4 Missouri Petroleum Association convention, President Hotel, St. Louis.

2-6 Corrosion short course, sponsored by National Association of Corrosion Engineers, University of California, Berkeley.

successful...

"FIRST-TIME" CEMENTING

BAKER CEMENT WASH-DOWN WHIRLER FLOAT SHOE Product No. 120

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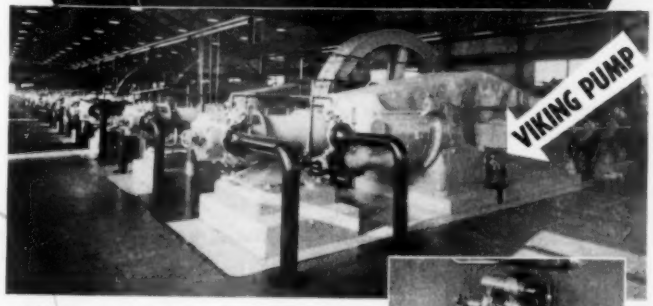

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27 Natural Gasoline Association of America, regional meeting, Scharbauer Hotel, Midland, Tex.

MARCH

2- 6 American Society for Testing Materials, spring meeting, Statler Hotel, Detroit.

4- 6 American Petroleum Institute, division of production, Southwestern district spring meeting, Hilton Hotel, Fort Worth.

8-11 American Institute of Chemical Engineers, Buena Vista Hotel, Biloxi, Miss.

15-17 American Petroleum Institute, division of production, Eastern district spring meeting, William Penn Hotel, Pittsburgh.

15-19 American Institute of Mining and Metallurgical Engineers, annual joint meeting of petroleum, metals, and mining branches, Statler Hotel, Los Angeles.

16-20 National Association of Corrosion Engineers, ninth annual conference and exhibition, Hotel Sherman, Chicago.

18-20 American Petroleum Institute, division of production, Mid-Continent district meeting Mayo Hotel, Tulsa.

23-25 Western Petroleum Refiners Association, annual meeting, Plaza Hotel, San Antonio, Tex.

23-26 American Association of Petroleum Geologists, Society of Exploration Geophysicists, and Society of Economic Paleontologists, annual meeting, Rice and Shamrock Hotels, Houston.

30-31 Texas Independent Producers and Royalty Owners Association, annual meeting, San Antonio.

30-
Apr. 1 Mid-West Gas Association, Broadmoor Hotel, Colorado Springs, Colo.

APR.

8-10 American Petroleum Institute, division of production, Eastern district meeting, William Penn Hotel, Pittsburgh.

15-17 National Petroleum Association, mid-year meeting, Cleveland.

21-23 Southwestern Gas Measurement Short Course, University of Oklahoma, Norman.

24-25 Interstate Oil Compact Commission, 1953 spring meeting, Roosevelt Hotel, New Orleans.

26-29 American Institute of Chemical Engineers, Chemical Institute of Canada, joint meeting, Royal York Hotel, Toronto, Ont.

27-28 Independent Petroleum Association of America, mid-year meeting, Jefferson Hotel, St. Louis.

Apr. 29-
May 1 Natural Gasoline Association of America, annual convention, Rice Hotel, Houston.

MAY

4- 5 American Petroleum Institute, division of marketing, midyear meeting, Baker Hotel, Dallas.

7-8 American Petroleum Institute, Rocky Mountain district, Division of Production, spring meeting, Gladstone Hotel, Casper.

11-13 Southern Gas Association, Jung Hotel, Hotel, New Orleans.

14-23 International Petroleum Exposition, Tulsa.

24-27 American Gas Association, production and chemical conference, Hotel New Yorker, New York City.

28-29 Natural Gas and Petroleum Association of Canada, London, Ont.

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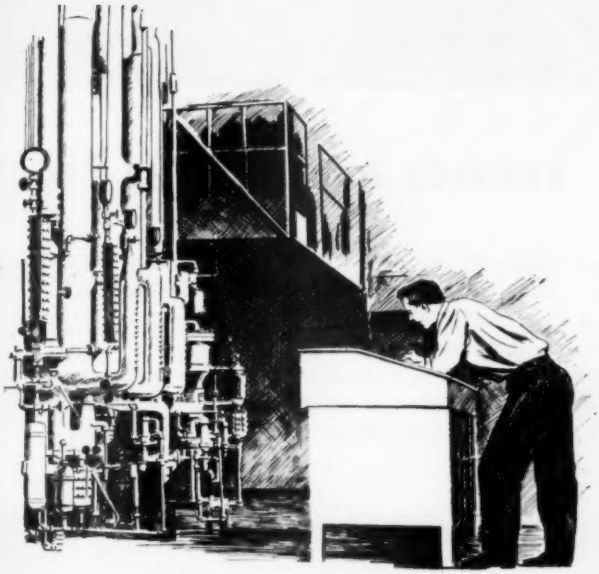

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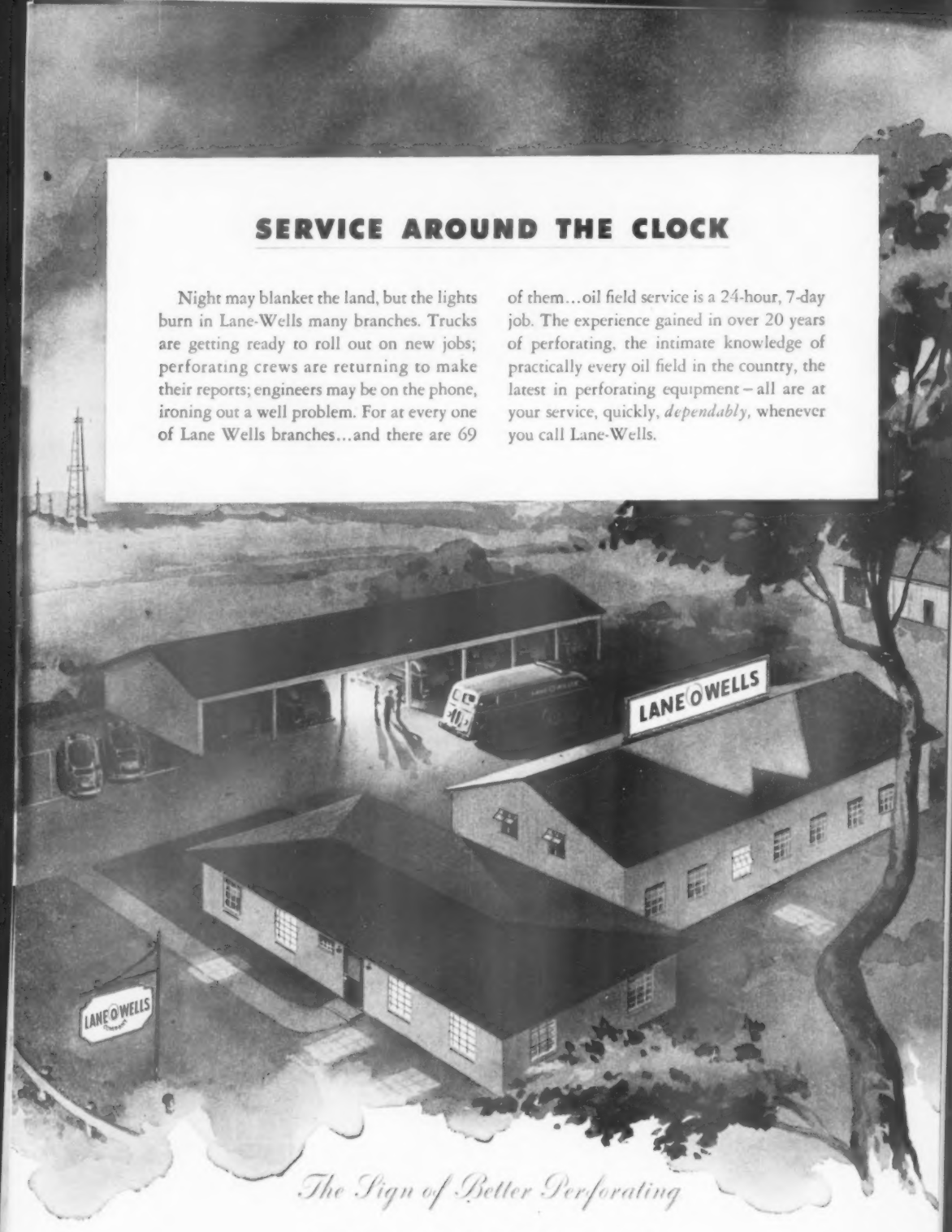

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JOURNAL
TULSA, OKLAHOMA

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JOURNALLY Speaking

See You at the A.P.I.

WELL, we're off for the A.P.I., and this year we're taking a shoe horn to help us get through the lobby and into the elevators. There may be bigger industry conventions than this one, but we don't see how they can get into one hotel. The fact is that all the A.P.I.-ers can't get into the lobby of the biggest hotel in the world at the same time. We've been there when they tried.

The Ancient World had a saying that if you stood on the main street of Damascus you would see all the people in the world, and that pretty much applies to the A.P.I. If you stand around the lobby long enough you will see, maybe not quite all the people in the oil industry, but just about everybody connected with oil you ever knew and several thousand others besides.

But that's one of the best features of the A.P.I. annual meeting—seeing your friends. We're not implying that the general sessions and committee work aren't important. But it would be almost worth having the meeting for no other purpose than to bring together several thousand oil men from every branch and area of the industry.

Oil men are a sort of fraternity, and they move around so much that they have friends everywhere. Renewing acquaintances at the Big Meeting maintains the informality and directness which have always characterized the oil industry. That's why a favorite parting of oil men is "See you at the A.P.I."

Facts and Figures

LIKE statistics? We are quickly bored with them, but we take a weird delight in digging out odd and useless figures of the "so what" variety.

In that spirit we thumbed through the new edition of "Automobile Facts and Figures," just sent us by the American Automobile Association, from which we culled these startling facts:

Among the larger population centers, Los Angeles County, California, has the most cars in proportion to people—2.8 persons per passenger car, and 0.9 family per car; Tulsa County, Oklahoma, comes next with exactly 3.0 persons per car and 1.0 family per car.

The number of diesel-engined trucks sold in the United States increased from 5,600 in 1948 to 16,500 in 1951.

There are 3.6 people for every passenger car in the United States, so all of us could go riding at once without crowding—except in Mississippi where the average is 7.4. In Nevada the average is only 2.6.

Twelve per cent of car-owning families own more than one car.

There are 3.0 people per motor vehicle (cars, trucks, and buses) in the United States, 4.9 in Canada, 5.1 in New Zealand, and 5.4 in Australia. No other part of the world comes close to this. A few samples: England, 15; Iceland, 13; Russia, 107; Yugoslavia, 682; China, 8,745; Venezuela, 39; Iran, 545; Fiji Islands, 85.

There are more drivers than cars, ranging from 1.03 in Montana to 1.72 in the District of Columbia (book doesn't say if this includes back-seat drivers).

Forty-two per cent of passenger-car breakdowns on the roads last year were due to tire or battery trouble; 2.9 per cent ran out of gas.

A new car priced at $2,000 includes $650 in taxes.

Motor vehicles in the United States traveled 482 billion miles last year.

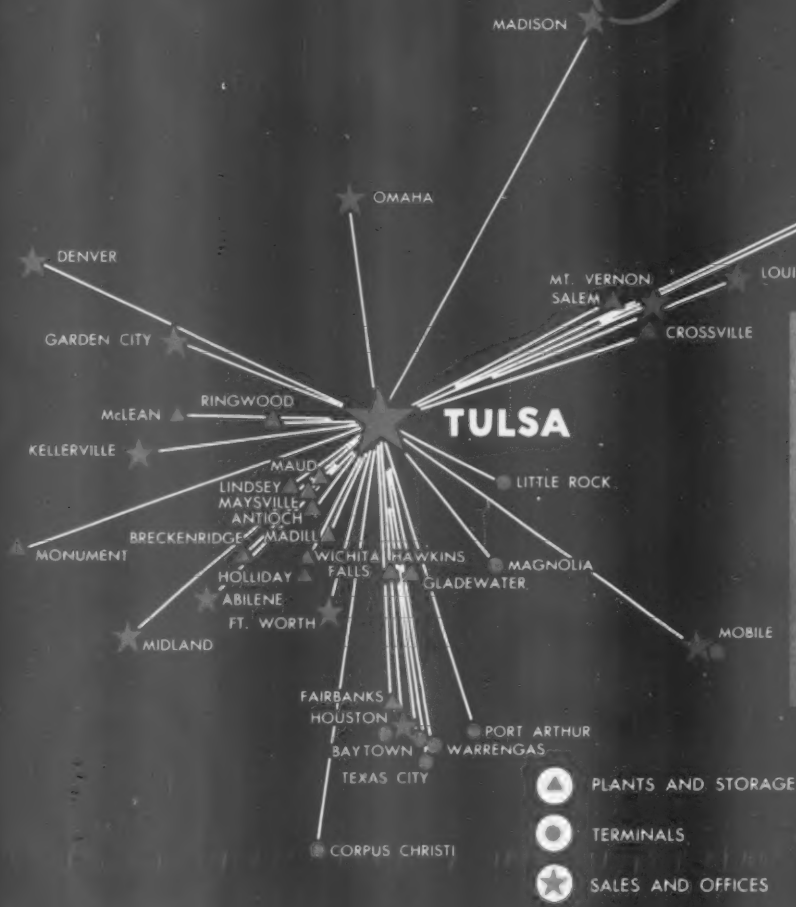
The average automobile scrapped is 13.5 years old and had traveled 116,500 miles.

Taxicabs carried 1,577,781,044 passengers in 1951, which is, on the average, 10 rides for every man, woman, and child in the United States. (This should have enabled the drivers to give the entire population a complete education on the weather, traffic conditions, and political trends.) The nation's taxi bill last year was $881,841,464, not counting tips.

If there's anything else you'd like to know about the automotive industry, please look it up yourself.

Henry D. Ralph

Service Centers



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The tumult and the shouting dies . . . now there's a big job to be done

BUSINESS won a major victory at the polls last Tuesday, and the oil industry had a big part in it. Oil men got into politics openly and told the voters their attitude on tidelands, taxation, government controls, and other issues.

The election was not a mandate for business to "take over" the Government, but it was a triumph for the business viewpoint—for the philosophy of free competition, less government interference, and a practical approach to economic problems. Many other issues moved the voters, of course, but there can be no doubt of the people's desire for a better climate for industry.

This is a great day for the oil industry. Will it be just a great day, or will it be the beginning of a great era? The answer depends on whether oil men continue to state their case in public, to impress their views on legislators and administrators, and to take an active and proper part in helping to solve the nation's problems.

HAVING helped to upset a policy of business harassment, the oil industry has a responsibility to follow through and help establish a concrete and constructive program.

For a long time there has been a complaint of too much government in business and not enough business in government. To reverse this requires that business, including the oil industry, take an active part in solving problems which inevitably become the concern of the federal Government.

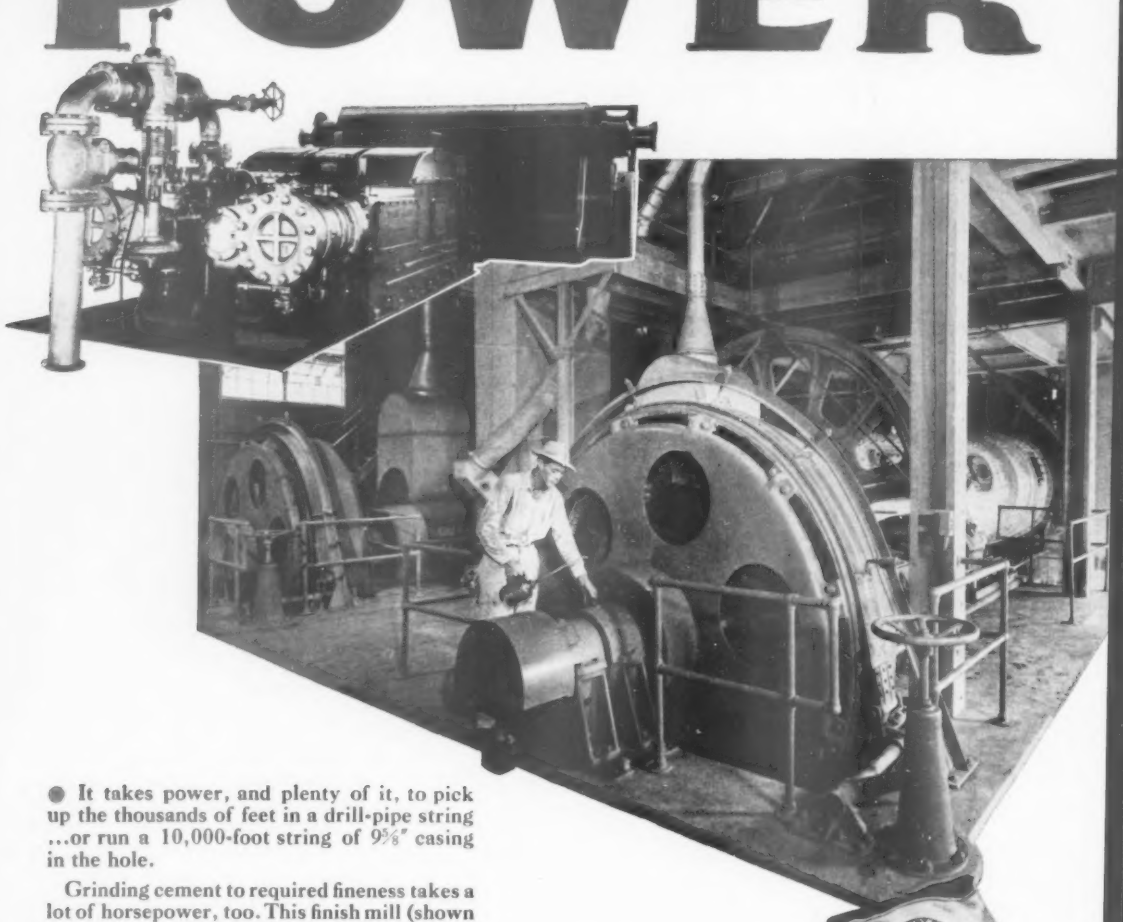
It is not enough to complain that the Government is doing things wrong. The industry must assist in getting things done right. This will require real statesmanship, genuine cooperation, and some sacrifices. The industry must lend good men for government service, and must take the lead in formulating policies for the good of the nation.

IN the international field particularly there is a big opportunity for the oil industry. The new administration comes in with a pledge to bring about prosperity based on peace, and today certainly our domestic situation depends greatly on the condition of our foreign relations.

International oil has always been a problem for both our State Department and our domestic industry. Today, more than ever before, all divisions of the oil industry are fairly well agreed on the outlines of a national and international oil policy. And now the advent of a new administration in Washington offers a chance to have such a policy accepted and adhered to by all federal agencies.

The election can be interpreted as a gratifying popular endorsement of much of what the oil industry has been advocating. But it will be an empty victory unless the industry follows through.

POWER



● It takes power, and plenty of it, to pick up the thousands of feet in a drill-pipe string ...or run a 10,000-foot string of 9⅝" casing in the hole.

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THIS WEEK

JUST FOR FUN and for no other reason at all except to be in the spirit of Halloween and show that a big corporation has a human side, Union Oil Co. made a jack-o'-lantern out of one of its big pressure tanks. An orange primer coat had been applied just before Halloween, and what followed was a natural. Eyes on the 80,000-bbl. tank at the Wilmington refinery are 16 by 18 ft.

INTERNATIONAL.—Royal Dutch-Shell completes the platform for its first major test in the South China Sea about a mile off the coast of British Borneo. . . . Shell hopes the offshore well will extend Seria field—the most productive field in British territory. . . . ¶United States and Britain reportedly will make no more efforts in the near future to settle the oil issue with Iran. . . . ¶Manabi Exploration brings in wildcat gasser 5 miles from the nearest production on the Santa Elena Peninsula in Ecuador.

REFINING.—General Petroleum reveals it will build the first refinery in the Pacific Northwest to operate on crude piped in from Alberta. . . . The 35,000-bbl. plant, estimated to cost $35,000,000, will be located at Ferndale, Wash., 12 miles south of the Canadian border. . . . ¶Standard Oil Development announces new type of motor oil which reportedly will reduce octane buildup in high-compression cars, lower friction wear, and give better low-temperature starting and all season service. . . . ¶Proven Oil & Refining reveals it will begin construction of its $18,000,000 refinery at Florence, Ariz., about January 1. . . .

PIPE LINES.—Continental Pipe Line reveals it will lay a 600-mile, 8-in. products pipe line from Billings, Mont., to Spokane as soon as materials are assured. . . . Announcement follows closely on heels of announcement by California Standard that Salt Lake Pipe Line, its subsidiary, would extend its products line from Pasco, Wash., to Spokane. . . . ¶Platte Pipe Line welds last section of its 1,000-mile, 20 and 16-in. crude line from Worland, Wyo., to Wood River, Ill. . . . ¶Trans Mountain to extend crude line from Vancouver, B. C., to Ferndale, Wash., site for General Petroleum's projected new $35,000,000 refinery.

GOVERNMENT.—Election of Eisenhower, coupled with a Republican-controlled Congress, gives oil industry a less gloomy outlook for the future. . . . Expected benefits include return of the tidelands to the states, less regulation of company operations, relaxation in drive toward government synthetics program, more business-like administration of government through agencies dealing with the oil industry. . . . ¶Aim of Government's cartel charges against seven major companies now appear to be "reconstruction" of oil industry. . . . First goal apparently is to force Arabian American to sell oil to companies other than its owner companies. . . . PAD announces program to increase output of TEL to 570,000,000 lb. yearly by beginning of 1954. . . .

EXPLORATION.—Aerial bomb found effective in seismic work described before West Coast A.A.P.G. meeting. . . . Bomb is shot from mortar to predetermined height. . . . New technique is faster, cheaper than conventional shot-hole work and just as effective in some areas, developer says. . . . ¶Amerada finds its fifth oil field in North Dakota, halfway between Tioga and Croft pools, still on Nesson anticline. . . .

TRENDS.—Total well completions through November 1 amounted to 38,647 wells for a gain of 1,977 over same period last year. . . . If completions averaged about 900 a week for the remainder of the year, the total will be about 46,200 or about 400 more than was forecast by the Journal at midyear. . . .

ACTIVITY.—Production of crude and lease condensate averaged 6,541,300 bbl. daily for week ended November 1, up 1,575 bbl. daily from previous week. . . . ¶Total well completions for the week increased 45 wells to 913. . . . Wildcat completions totaled 234 compared with 222 for previous week and 209 for same week last year. . . . ¶Rotary rigs operating in United States gained 23 rigs for week ended November 3 to 2,592. . . .

What Oil Can Expect From Eisenhower

MR. PRESIDENT . . . . . beginning January 20.

Less interference, fewer controls will be the rule under a new government; here's the short and long-term outlook

Bertram F. Linz

WITH the election of the first Republican president in 20 years the United States is looking forward to a new, fair administration.

Not immediately, but over a period of the next 2 or 3 years, the complexion of the federal Government will be changed—a long overdue face-lifting characterized by less reliance on detailed regulation of industry and business, less eagerness to invade fields where economically wise business men are unwilling to go, and a more business-like approach to the business of running the country.

For the oil and gas industry, the election of Dwight D. Eisenhower means the ending of the long-standing controversy over the tidelands, with title to their offshore oil resources returned to the states of California, Texas, and Louisiana.

To the industry, too, the election brings hope of a badly needed new setup in which the cards will not be stacked and oil will not be made a whipping-boy to be trotted out and flogged whenever it seems politically expedient.

In these and other ways the long deferred change in the national administration will be of benefit to the oil industry, and to industry and business generally.

Middle-road course . . . The Eisenhower administration is not expected to go as far to the right as its predecessor Roosevelt-Truman administrations went to the left, but to adopt what might be termed a moderately progressive course. It will not—could not, in fact—reject the social legislation already enacted to provide unemployment insurance, old-age pensions, etc., and probably actually will broaden aids to education and health, but it isn't likely to add socialized medicine or other Truman social aims to the list.

The immediate major problem which Eisenhower faces and which will be the keystone of his whole program is that of the war in Korea. There are three possibilities — a peaceful termination, continuation of the present limited conflict or its development into war with Russia—each of which would call for differing economic policies, at home and abroad.

How oil benefits . . . Barring a general war, this, in its broadest terms, is what the election of Eisenhower will mean to industry:

. . . New men and new ideas in the nation.

. . . Interior and Justice departments which will bring entirely different approaches to domestic and international problems involving oil.

. . . An end to the harassment of business at home and more vigorous support of its proper activities abroad.

. . . Abandonment of efforts to force industry into new fields before they are shown to be economically sound.

. . . Economy in government and an eventual lightening of the tax burden.

These are the objectives at which Eisenhower, on the basis of his campaign statements, will aim. But it is less a question of what the new President will do than what he can do, for much of what he does must be sanctioned by Congress.

Congress and cabinet . . . The new Congress seems to bid fair to cause Eisenhower trouble. With no comfortable margin of votes in either the House or Senate, the success of his programs will depend upon their palatability to Democratic members who may be tempted to swing away from the party line.

Eisenhower's first struggle with Congress is likely to be over continuation or abandonment of present emergency controls on prices, wages and materials.

The thinking and policies of a President are colored to considerable degree by the men he selects for his Cabinet, as White House advisers, and as the heads of the federal agencies. There will be fewer theorists and idealists in the Eisenhower administration and more practical businessmen, and consequently a more sympathetic attitude toward business.

Outlook on agencies . . . Much of the regulatory power of the Government over industry is applied through the so-called independent agencies such as the Federal Trade Commission, Federal Power Commission, Securities and Exchange Commission, and the Tariff Commission. Through these the President can give quick expression of new policies toward business.

While the members of these agencies are appointed for fixed terms, the President in some cases is authorized to designate the chairmen and in others it is customary for the chairmen to re-

sign their posts, but remain as commissioners, with a change in administration.

Currently, all the agencies have a Democratic majority and since the terms of the commissioners are staggered it will be a year or two before a Republican majority is set up. But effective control will come more quickly, for the commissions' actions usually reflect White House policies.

... The Federal Trade Commission is likely to change its course on enforcement of the Robinson-Patman Act, adventures into new methods of softening competition, investigations such as the oil cartel study, and similar activities.

The President can designate the chairman of the commission who, in turn, appoints the personnel and assigns duties. Former Sen. James M. Mead, Democrat, is now chairman of the commission, on which Lowell B. Mason is the only Republican member.

But the term of one Democratic member expires next year and another in 1954, and they can be replaced by Republicans to give the administration three of the five positions.

... The Federal Power Commission has Thomas B. Buchanan, Democrat, as acting chairman under a recess appointment subject to Senate confirmation. Buchanan's name undoubtedly will be withdrawn in favor of a Republican to create a 3-2 administration majority.

... The tariff commission follows a practice under which the chairman and vice chairman resign those posts but continue as commissioners when a new president takes office. In addition to naming new top men, however, Eisenhower will find two vacancies on the committee to which he immediately can name men of his own choice.

Early tests in Congress ... Republican organization of Congress will mean a general change in the chairmanship of the committees. Here the Democratic party lost some of its most consistent supporters of Truman.

Among them were Sens. Ernest W. McFarland of Arizona, majority leader, and Joseph C. O'Mahoney of Wyoming, chairman of the Interior committee and sponsor of legislation for federal administration of the tidelands.

Republican control of Congress, however, is so slim that frequent conflicts between the executive and the legislators are inevitable. The elections indicated clearly that the voters were seeking a leader to replace one in whom they had lost confidence but that there was no similar antipathy to the Congress. That means that Eisenhower will have to sell his policies to a Congress where the opposition party can muster an impressive strength.

The new administration will be put to the test within a matter of weeks after it takes over the reins of government, as specific-term laws expire and policies must be developed on vital issues.

... The President's special emergency powers and his authority to reorganize the Government will expire April 1.

... Price, wage, and rent controls and settlement of labor disputes will terminate April 30.

... The reciprocal trade act, long a highly controversial matter, will expire June 12.

... Controls and materials, the President's authority to make defense contracts, and his authority to regulate exports will expire June 30.

... The excess profits tax adopted in 1950 also will expire June 30, and the increased rates on corporate and individual income taxes in the 1951 Revenue Act will terminate December 31, 1953.

... The selective service's authority to draft 18½-26 year olds and the President's authority to call up reserves will terminate July 1, and his authority to renegotiate defense contracts will lapse December 31.

... The Taft-Hartley Act will be a major issue.

What to expect ... Eisenhower will take definite steps to support the defense program, prevent further inflation, and protect against a recession, but they will involve a minimum of direct regulation.

The Reciprocal Trade Act probably will be continued—European economy would be badly jolted otherwise—but with increased safeguards for domestic industry. The Taft-Hartley Act will be modified in a number of respects—Senator Taft himself has conceded the need for amendment—but will still be aimed at keeping the unions in line and may include a ban or control on nation-wide bargaining.

The new administration will try to make sharp cuts in government spending with a view to reducing taxes. It will find, however, that it can shave relatively little from the appropriations for the civilian operations of the Government, which comprises only a small part of this year's $85 billion budget.

Laws, tradition and the fact that much money already has been invested in them will prevent the abandonment immediately of government projects developed under Truman policies, but it will be possible to limit further spending on many of them.

... Synthetic liquid fuels research by the Bureau of Mines will continue. Close to $100,000,000 already has been spent on it, but the bureau may find the new President and Congress unreceptive to any further expansion of the program, and there will be less emphasis upon the immediate development of a synthetic-fuels industry.

... The percentage depletion allowance will stay on the statute books. It is expected that a Republican-controlled Treasury will drop the effort to wipe it out, although it may be reduced to be more in line with other depletion allowances.

... Return of the tidelands to the states is expected without any difficulty.

That issue got Eisenhower some votes he would not otherwise have received; restoration of state title was promised in the Republican platform; Vice President Nixon is from California, the first state to be attacked; and both Republicans and Democrats in Congress have consistently fought federal administration of the offshore oil.

Also in the cards ... All along the line there will be less danger of further government invasion of industry, and an increased awareness of the need to provide incentives for private capital to do what is necessary to keep pace with the growing economy.

The biggest field for economy seen by the Republicans is in the expenditures for military preparedness and for foreign aid. The military estimates for the 1954 fiscal year are expected to be no higher and may be slightly lower than present levels. They are likely to be whittled down heavily if the international situation shows no sudden and serious deterioration, but it is doubtful whether they can be cut to the point where any immediate reduction of taxes would be possible. It may be possible, however, to reduce or abandon the excess profits tax and the last increase in income taxes when they expire next year.

Eisenhower's job ... President-Elect Dwight D. Eisenhower today faces a formidable task.

He must fight off inflation if the international situation deteriorates, and avoid a business recession if military expansion slows down. He must deal with ticklish problems abroad. He must set up a clean house in government. And, above all, he must convince the people that his way of doing all this is a preferable alternative to the 20 years of easy handouts which are about to end.

He has just 2 years in which to do all this. Then the people will again go to the polls and if he has failed there will be an unfriendly Congress from which he may get the same treatment that made it impossible for Herbert Hoover to do anything in the last days of his administration and to lesser degree thwarted Harry S. Truman.

A. P. I. to Open Annual Meeting Today in Chicago

The men who will conduct this year's big conclave are shown on these pages

Chairman and president . . .

L. S. WESCOAT
Pure Oil Co.

FRANK M. PORTER
Fain-Porter Drilling Co.

CHICAGO.—More than 5,000 executives and technical men engaged in every division of the oil and gas industry were expected here this week for the thirty-second annual meeting of the American Petroleum Institute.

Group and general sessions begin Monday morning, November 10, and end with the big general session Thursday morning, November 13. Another general session is scheduled for Wednesday morning, and the remainder of the program is given over to group sessions dealing with fundamental research, public relations, transportation, marketing, evaporation losses, refining, financial and accounting, lubrication, and the American Petroleum Industries Committee.

Scores of committee meetings are scheduled throughout the 4 days, with others being held Saturday and Sunday in advance of the formal opening.

Prominent speakers from outside the oil industry include Oscar L. Chapman, Secretary of the Interior; Oveta Culp Hobby, publisher of the Houston Post; and Sen. William F. Knowland of California.

Other speakers at the general sessions will be Frank Porter, president of the A.P.I.; L. S. Wescoat, president of Pure Oil Co. and chairman of the A.P.I. board of directors; S. A. Swensrud, president of Gulf Oil Corp.; and T. S. Petersen, president of Standard Oil Co. of California.

A detailed program of the group and general sessions was printed in *The Oil and Gas Journal of October 13.*

. . . the veeps

J. C. DONNELL, II
Ohio Oil Co.
Production

W. L. STEWART, JR.
Union Oil Co. of California
Refining

. . . the treasurer . . . and the secretary

HARRY J. KENNEDY
Continental Oil Co.
Marketing

P. C. SPENCER
Sinclair Oil Corp.
Transportation

B. BREWSTER JENNINGS
Socony-Vacuum Oil Co. Inc.

LACEY WALKER
American Petroleum Institute

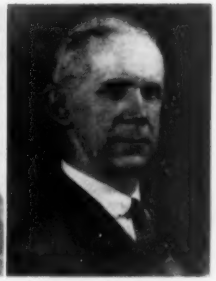
Chairmen of A.P.I. Standing Committees . . .

SIDNEY A. SWENSRUD
Gulf Oil Corp.
Agriculture

R. G. FOLLIS
Standard Oil Co. of Calif.
Nomination

B. I. GRAVES
Tide Water Assoc. Oil Co.
Library

A. C. MATTEI
Honolulu Oil Corp.
Membership



A. JACOBSEN
Amerada Petroleum Corp.
National Oil Policy

H. S. M. BURNS
Shell Oil Co.
Public Relations

R. E. WILSON
Standard Oil Co. (Ind.)
Research

J. R. SUMAN
Standard Oil Co. (N. J.)
Safety

J. S. LEACH
The Texas Co.
Special Reports

R. H. COLLEY
Atlantic Refining Co.
Program and Budget Review

Presiding Officers at Group Sessions . . .

H. G. VESPER
Calif. Research Corp.

C. Z. HARDWICK
Ohio Oil Co.

J. H. McCLINTOCK
Esso Standard Oil Co.

R. B. McLAUGHLIN
The Texas Pipe Line Co.

R. A. MARTIN
Standard Oil Co. (Ohio)

G. M. STEARNS
Br.-Amer. Oil Prod. Co.

W. L. McCLOY
Sohio Petroleum Co.

C. S. GENTRY
Shell Oil Co.

R. O. GARRETT
Arkansas Fuel Oil Co.

G. E. CANNON
Humble Oil & Ref. Co.

B. G. SYMON
Shell Oil Co.

. . . and Speakers at the Various Group Sessions

A variety of technical and nontechnical sessions will make up the A.P.I.'s thirty-second annual meeting. Here are the speakers who will appear

H. H. ANDERSON
Shell Pipe Line Corp.

C. C. ASHLEY
Consulting mech. engr.

DISCUSSIONS of interest to a particular branch or activity of the oil industry are scheduled at the 15 group sessions of the A.P.I. annual meeting, and it is at these sessions that many of the more significant reports and addresses are presented.

Among the highlights of these sessions will be three discussions of future trends: by Courtney C. Brown, a director of Esso Standard Oil Co., at the marketing session; by John E. Swearingen and John W. Boatwright of Standard Oil Co. (Ind.), at the refining session; and by Marcus Nadler, professor of finance at New York University, at the financial and accounting session.

Many of the papers at the group sessions deal with technical subjects, but others of general industry interest will discuss such subjects as public relations, the effect of competition, and problems of executive management.

T. F. BRADSHAW
Cresap, McCormick & Paget

R. R. BRATTAIN
Shell Dev. Co.

J. W. BOATWRIGHT
Standard Oil Co. (Ind.)

S. F. BOWLBY
Shell Oil Co.

H. L. O'BRIEN
Graver Tank & Mfg. Co.

B. L. MAJEWSKI
Great American Oil Co.

C. C. BROWN
Esso Standard Oil Co.

E. BROWNSCOMBE
Atlantic Refining Co.

W. A. BRUCE
Carter Oil Co.

JOHN S. BURCHMORE
Walter, Burchmore & Belnap

W. CALLAGHAN
U. S. Navy

OSCAR L. CHAPMAN
Secretary of Interior

RALPH E. DAVIS
Consultant

W. B. DUNCKEL
Bankers Trust Co.

ALVIN B. DYES
Atlantic Refining Co.

LLOYD E. ELKINS
Stanolind Oil & Gas Co.

J. R. ELLIS
Sunray Pipe Line Co.

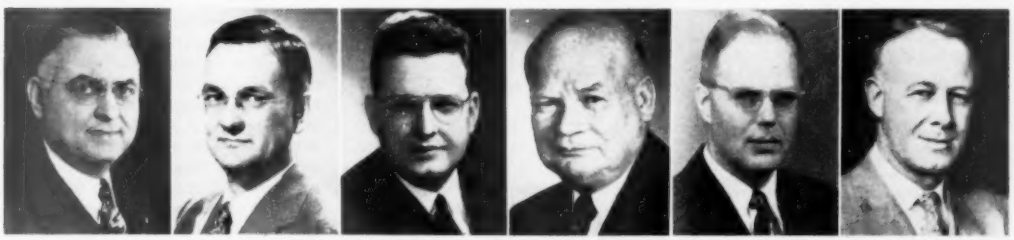
O. H. ELLIS
Nat'l Jobbers Council

H. N. EMERSON, Atlantic Ref. Co. | EDWIN W. ESMAY, A.P.I. Dept. of Information | OVETA C. HOBBY, Houston Post | W. R. HUBER, Gulf Oil Corp. | O. W. JOHNSON, Standard Oil of Calif. | W. F. KNOWLAND, U. S. Senator

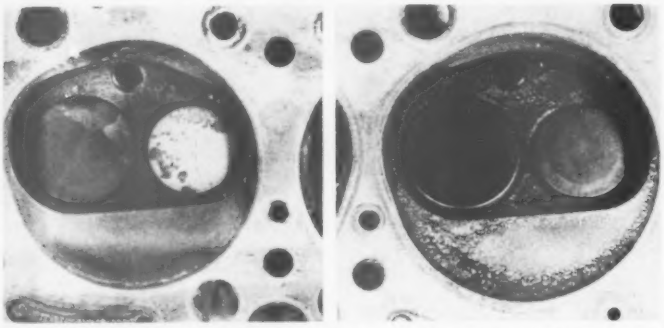
WAYNE E. KUHN, The Texas Co. | JOSEPH W. LODGE, Battelle Memorial Inst. | W. G. LOVELL, Ethyl Corp. | R. H. LYNCH, Keystone Pipe Line Co. | G. K. MANNING, Battelle Memorial Inst. | HARRY G. MOOCK, Lecturer, Counselor

ADM. BEN MOREELL, Jones & Laughlin | MARCUS NADLER, New York University | J. G. NORTON, Magnolia Pipe Line Co. | DONALD G. O'HARA, Natl. Petroleum Assn. | W. G. PERRIGUEY, Esso Standard Oil Co. | T. S. PETERSEN, Standard Oil of Calif.

GEORGE A. ROUND, Soc.-Vac. Oil Co., Inc. | W. D. SEYFRIED, Humble Oil & Ref. Co. | S. S. SHAFFER, Humble Oil & Ref. Co. | S. S. SMITH, Shell Oil Co. | A. A. STAMBAUGH, Standard Oil Co. (Ohio) | ALBERT B. STEVENS, General Pet. Corp.



R. G. STRONG, N.G.P.L. Co. of America | H. SUTHERLAND, Shell Oil Co. | J. E. SWEARINGEN, Standard Oil Co. (Ind.) | F. H. WILLIBRAND, Sohio Petroleum Co. | I. L. WISSMILLER, Chicago Bridge & Iron | R. C. ZELL, Union Oil Co. of Calif.



EFFECTS OF LUBRICANT on combustion-chamber deposits with new Uniflo oil (left) and a high-quality S.A.E. 10W motor oil (right).

New-Type Motor Oil

S.O.D. claims new oil will reduce octane buildup in high compression cars and lower engine wear due to friction

George Weber

NEW YORK.—Standard Oil Development Co., an affiliate of Standard Oil Co. (N. J.), has announced a new high-viscosity-index motor oil designed especially for use in high-compression engines operating with close tolerances.

Use of the new oil, soon to be placed on the market by Esso Standard Oil Co., is reported to result in less octane buildup in high-compression cars, reduced friction wear, better low-temperature starting and all-season service.

Trade-named Uniflo, it will sell about 50 per cent above premium motor-oil prices beginning December 1.

The oil has a viscosity index of 150-155 and will carry the S.A.E. viscosity classification 20-5W. It will meet the requirements of four viscosity classifications—S.A.E. 5W, 10W, 20W, and 20—and will be designated for Service MS and DG.

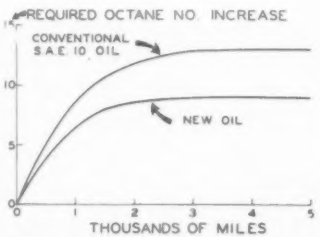
The properties of the oil, according to S.O.D., derive from a combination of improved additives, which include detergents, oxidation inhibitors, and viscosity-index improvers, and from better petroleum-base stocks produced from selected crudes by improved techniques in solvent extraction and other conventional refining methods.

Deposit prevention . . . Although Uniflo will not remove deposits already in existence in automotive engines, it is said to have certain properties that inhibit their accumulation in a clean engine. The deposits primarily are those which are attributed to lubricating oil.

Studies of combustion-chamber deposits indicate that they vary in type, origin, and sequence of deposition. J. B. Duckworth, Standard Oil Co. (Ind.) research department, reported in an S.A.E. paper in 1951 that the quantity of deposits and rate at which they accumulate in the combustion chamber depend primarily upon quantity of tetraethyl lead in gasoline, combustion-chamber design, and engine operating conditions. To a lesser extent, he said, deposit formation is affected by the type and consumption of lubricating oil and the composition of the gasoline base stock.

L. F. Dumont, of the Du Pont petroleum laboratory, reported at the same S. A. E. meeting on a study of cylinder-head deposits at various intervals during a laboratory test under steady medium-duty conditions with a fuel containing 3.0 ml. TEL per gallon.

Examination of a number of photographs of the deposits, Dumont said, indicates that with a leaded fuel, deposit accumulation occurred in three phases: (1) Accumulation of essentially carbonaceous material, (2) accumulation of lead salts, and (3) attainment of equilibrium of deposit quantity.



OCTANE REQUIREMENT increases compared using new S.A.E. 20-5W oil and high-quality S.A.E. 10W oil.

Lead salts, he said, as well as carbonaceous materials, are deposited during the carbonaceous phase of accumulation, but the carbonaceous materials predominate. The extent of the carbonaceous phase appears to depend upon the type of crankcase oil used, the amount of oil reaching the combustion chamber surfaces, deposit temperature, and other factors. Eventually, however, the accumulation of additional carbonaceous deposits is reduced substantially, and the accumulation of metallic salts becomes predominant.

S.O.D. reports that the new motor oil results in less carbonaceous deposition, because: (1) Its high viscosity index results in less oil being introduced into the combustion chamber, and (2) certain inherent properties of the oil inhibit deposition and result in deposits of a different type. Reduced carbonaceous deposits due to the new oil are in turn understood to result to some extent in reducing further deposits of metallic salts.

Octane buildup . . . The primary advantage of Uniflo's effect on reduced engine deposits, is reflected in the arrested increase in octane requirements of clean, high-compression engines.

Some new engines raise their octane requirements as much as 15 research numbers during the first 3,000 or 4,000 miles of service. This is due to the growth of engine deposits which promote detonation or knock by reducing the combustion chamber volume thereby increasing effective compression ratio, and by thermally insulating areas of the combustion-chamber walls to raise the temperature of the fuel mixture.

In cooperation with General Motors Corp., S.O.D. road-tested the new oil in a fleet of 18, Model 88, 1952 Oldsmobiles which have a compression ratio of 7.5:1 when clean. During the tests, conducted in the Southwest, Uniflo was compared with "conventional" motor oils under identical conditions.

The accompanying photographs illustrate the comparative results of using Uniflo and a high-quality S.A.E. 10W motor oil. This visual comparison of depositions was translated into octane requirements in cars operating on the two oils. The chart shows the octane buildup which resulted. Both curves show the familiar rapid increase in octane requirements during the first 2,000 miles of service and the leveling

off which results when net deposition reaches equilibrium—with deposits flaking off roughly as fast as they are formed.

The new oil shows a lower rate of increase in octane requirement. On the basis of the road tests, the equilibrium was reached at a point about 4 research octane numbers below that for the other oil. S.O.D. expects that further improvements in motor-oil properties may result in lower ultimate octane requirements on the part of high-compression engines. Other factors contributing to engine deposition may in the future, also reduce the figure. These include cleaner burning fuels, better TEL scavengers, and improved engine design.

Long-range viewpoint . . . Long-range result of the improved motor oil may be a stepping up of the compression-ratio trend in future passenger cars. If and when this oil, or other oils giving comparable service, become generally available throughout the country automotive designers will take advantage of the oil industry's contribution by increasing their ratios and their engine-power efficiency.

Meanwhile, some motorists driving "critical" cars which for various reasons show a tendency to knock on the grade of gasoline for which they were designed, may arrest the octane-requirement buildup while the engine is new, or after carbon has been removed.

Friction reduction . . . Further benefits are claimed for the new oil by its developers. Having lower viscosity than S.A.E. 10W and 20W at most temperatures, and lower viscosity than S.A.E. 30 oil at all temperatures, the new-type oil will show reduced engine wear due to friction. Corrosive wear can be cut 50 per cent, they say, because of the acid-neutralizing detergents present in the oil.

Despite its lower viscosity at most operating temperatures, oil consumption with the new product will be no higher than with conventional oils, according to S.O.D.

Advantages in low-temperature operation are claimed in easier starting and lower load demand on the battery. For newer cars, the oil may be used in all seasons of year throughout the country.

Continued research by S.O.D. and other oil companies is expected to result in still greater improvements in lubricating oil and gasoline properties. Further engine-design improvements other than outright compression-ratio increases are expected from the automotive industry in the cooperative effort to raise the over-all efficiency of the automotive engine.

New Shooting Technique

Experiments on mortar-ejected bomb exploded at preset height aboveground prove aerial method highly effective

D. H. Stormont

LOS ANGELES.—Experimental work on a new seismic shooting technique in which a mortar-ejected bomb is exploded at a preset height aboveground shows the aerial method is more rapid and less expensive than conventional shot-hole surveys.

In disclosing the new technique at the fall meeting of the Pacific Coast section of the Society of Exploration Geophysicists, its developer, Dr. J. J. Jakosky, of International Geophysics, Inc., said that in many areas the new method is just as effective as in-hole shooting.

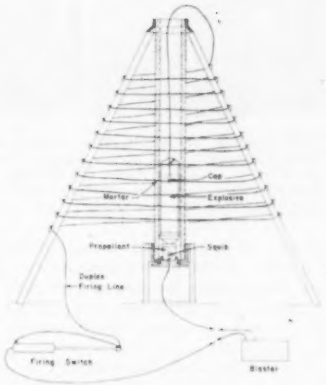
The bomb contains a high-velocity explosive and can be projected to a height of 50 to 600 ft. aboveground. By controlling the height at which the explosion occurs it was found that much of the detrimental effect of ground roll and other interferences could be minimized. Small increments of height are not critical, he stated, but in each type of area there are upper and lower height limits between which the explosion should take place.

Instrumentation in aerial shooting is almost identical with conventional seismic exploration, he brought out. Notably absent, however, are the drills, shooting truck, and water trucks. As to speed of survey, he said, a crew of this type can cover from 2½ to 3 miles of traverse line per day, under average terrain conditions, using 1,320 or 1,760-ft. split-spreads.

How bomb is fired . . . A mortar assembly weighing only 57 lb. is used to propel the bomb into the air. A firing squib and low-velocity explosive, placed below the bomb in the mortar, is used for this purpose.

Height at which the bomb explodes is controlled by a light-weight insulated firing line connecting a detonator cap imbedded in the bomb to a special switch mounted on one mortar leg. This length of conductor is coiled around the legs of the mortar. As the bomb rises into the air it uncoils the conductor until the end of the line is reached. Tightening of the line raises the firing switch and the explosive is detonated.

No metal is contained in the bomb case; it is made entirely of canvas and plastics. From 10 to 12 lb. of high explosive are contained in the bombs, which are 18 in. long and about 5 in. in diameter. Lower end of the case is of cellular construction with a suitable platform to provide shock insulation between the high explosive and the propellant.



WHEN BOMB is fired from the mortar the attached firing line uncoils from around the legs and when bomb reaches desired height the detonating switch is pulled.

Design of the bomb and characteristics of the explosive are such that the shock wave resulting from the explosion is within the frequency band which will allow maximum transfer of energy through the weathered zone and, at the same time, give optimum reflection efficiency.

Interference problems . . . Instantaneous peak pressures created by the shock wave upon striking the surface of the ground varies almost inversely with the height of the explosion, Dr. Jakosky stated. Height at which the bomb is detonated, however, is complicated by a number of factors which tend to mask the reflections of economic interest.

These complex interferences he classified under four general types: (1) Direct air waves, (2) surface or Raleigh waves, (3) multiple reflected or Love waves, and (4) scattering and diffraction. In addition there is present a random type of interference which generally lies in the upper part of the seismic frequency band.

In discussing these interferences Dr. Jakosky brought out how their effects could be lessened, stating in part that:

"Coupling of the air wave with the

NEW A.A.P.G. OFFICERS of the society's Pacific Coast section are, left to right, Rufus H. Smith, Continental Oil Co., Los Angeles, vice president; Russell R. Simonson, Ohio Oil Co., Los Angeles, president; Robert G. Maynard, Sunray Oil Corp., Los Angeles, secretary; and Tom E. Folsom, Honolulu Oil Corp., Los Angeles, treasurer.

ground wave can be minimized if the explosive charge is positioned at a certain height above the ground; the height primarily being a function of the spread length and the phase velocity in the surface layer.

"Since the shock wave travels in a radial direction from the point of explosion, it will be apparent that with the charge positioned at an elevation above the surface of the earth only one component of the released energy travels parallel to the surface of the ground.

"The height is chosen so that the horizontal component of velocity of the air wave is different than the phase velocity of the ground wave through the surface layer. Under this condition, coupling will be minimized and the occasional Raleigh waves which may be generated will persist only for short distances and will seldom carry across the entire record."

In aerial shooting, depth and velocity of the weathered zone is determined by making a shallow refraction shot at the point occupied by the mortar. About 2 lb. of explosive placed about 18 in. above ground is used for this recording, he said.

GULF COAST

Gulf Fields Studied

Annual meeting of Gulf Coast geological societies takes up area's geology, applicable methods, and field studies

Philip C. Ingalls

CORPUS CHRISTI.—Where to look for oil along the Gulf Coast and how to interpret geological data obtained in many fields of the region were discussed in a series of papers delivered at the second annual meeting of the Gulf Coast Association of Geological Societies here November 6-8.

The association is composed of the geological societies of New Orleans, Shreveport, South Louisiana, Mississippi, Corpus Christi, East Texas, and Houston. The meeting followed the pattern established at the association's first meeting in New Orleans last year of holding an annual discussion and publishing manuscripts or digests of papers dealing with special geological situations in the Gulf Coast area.

Louisiana Wilcox field . . . Structural maps on upper data will not always suffice as a secure footing for an exploitation program aimed at sands deeper within the formation, Robert J. Moffatt said in his paper on Fairview field, Concordia Parish, Louisiana.

Moffatt, Carter Oil Co., Shreveport, pointed out that a marker located stratigraphically near the midpoint of an oil-productive section can be used to lessen structural distortion created by thickening and thinning of productive sands. The strategically located "6,800-ft. lignite" bed was used to guide development in Fairview field.

Moffatt said that a seismic anomaly led to the drilling of the discovery well of Fairview, which is typical of the smaller fields discovered in recent years within the "Wilcox trend" of North Louisiana. The field now has eight wells producing sweet, 40°-gravity oil from an estimated ultimate reserve of 3.7 million barrels in five primary sands beneath 400 productive surface acres.

He pointed out that a typical Wilcox development pitfall was experienced in the development of the field when considerable effort was expended on a well which proved to have encountered a reservoir at a point where the oil in its recent migration had left a transition zone of good staining but produced water.

"Unrecognized situations of this type," he added, "can have a drastic influence on the calculation of reliable reserve figures and create a false and distorted picture of the productive outline of a given reservoir."

East Texas salt basins . . . The various salt beds penetrated in the East Texas area thus far are from a sequence of Upper Jurassic age, in the opinion of R. W. Eaton, P. G. Lake, Inc.

Eaton said this age is indicated for the salt penetrations in Hawkins and Quitman fields in Wood County, "Ginger" field in Rains County, and Chapel Hill field in Smith County.

He proposed that the area now occupied by the Mineola, La Rue, and Brooks-Boggy Creek basins constituted a single depositional basin until the close of Jurassic time, except for local early structural growth at Van, Hawkins, and Kelsey; then subsequent to Travis Peak deposition, and certainly by the end of lower Glen Rose time, this broad basin was broken up into smaller components by low-relief anticlinal and structural ridge growth typified by South Tyler ridge, Winnsboro-Quitman anticlines, and Tennessee Colony-Blackfoot-Isaac Lindsay anticlinal ridge.

Eaton said he had concluded that the strike-faulting and associated reservoirs encountered along the inner periphery of the Mineola basin of central Wood and northwestern Smith counties, Texas, are the result of tensional stresses set up by the evacuation of salt from under the basin outward into areas occupied by the domal and anticlinal structures located along the outer periphery.

Contrary to general thinking, Eaton said he proposes that the Haynesville piercement-type salt dome is the result, not the cause, of the Mineola basin; that the plug is extreme late Cretaceous in age, whereas the basin has been receiving sediments continuously since late Jurassic time.

Sand accumulation . . . How some sand concentrations may have developed in ages past was indicated by a study of an area of recent sand accumulation presented by Dr. Alan Lohse, Shell Oil Co., Corpus Christi.

Dr. Lohse outlined the origin of the sandsheet in Kenedy, Brooks, eastern Jim Hogg, and portions of Hidalgo and Willacy counties in Southwest Texas.

He pointed out that by vector anal-

yses of the surface-wind direction, velocity, and duration he was able to determine the direction in which the surface winds expend the greatest amount of energy month by month. From this study he found that for 8 months of the year winds direct their work against the upper Texas coast at such oblique angles that the resulting movement of water and sediments is counterclockwise. During another set of 8 months out of the year the wind's work is directed against the lower Texas coast so that the resulting movement is clockwise.

Thus, he said, 16 wind-months act yearly to transport beach and shallow-marine sediments into the vicinity of 27° north latitude, where a great excess of sediments over the normal beach and barrier-island profile exists. From this concentration the sand is spread across Southwest Texas by eolian sorting and transportation to form the distinctive sandsheet with its desert physiography.

Southeastern states . . . Future reserves of oil and gas can be expected to be found widely distributed in the eastern Gulf Coastal Plain according to P. H. O'Bannon, Humble Oil & Refining Co., Tallahassee, Fla.

O'Bannon said that all of the land area of Florida and the southern counties of Alabama and Georgia offer geologically inviting prospecting areas; that the total thickness of Tertiary to Paleozoic rocks may reach 25,000 ft. near the Gulf shore. He pointed out that production is now obtained from both Upper and Lower Cretaceous beds and that oil and gas shows have been found in the shallower downdip Tertiary units and deeper Jurassic rocks.

The paper presented by O'Bannon was coauthored by Morgan J. Davis, vice president and director in charge of exploration for Humble Oil & Refining Co. and president of the American Association of Petroleum Geologists. It pointed out that it has been only in the last 12 to 15 years that intelligent wildcat locations have been made. In part, at least, this accounts for the low success ratio of 1 oil well for every 127 dry holes. *(This paper was covered in more detail in the May 19 issue of the Journal, page 90.)*

Tilted water tables . . . The anticline theory of oil accumulation is but a special case—oil and gas may occur in structural terraces, noses, monoclines, and other unclosed structures entirely devoid of lithologic barrier to updip migration, according to a theory convincingly demonstrated at the G.C.A.G.S. meeting by M. King Hubbert, Shell Oil Co., Houston.

Hubbert said that geologists are going to have to supplement their customary knowledge of structure and stratigraphy with a study of three-dimensional ground-water hydrology if many accumulations of oil are not to be overlooked. He showed that if formation water is at rest, impelling forces will be directed vertically upward and traps will be the familiar ones of the anticlinal theory; but, when the water is in motion in a nonvertical direction, oil and gas equipotentials will be tilted downward in the direction of flow. Hubbert said that tilted water tables were known in almost every major producing area. *(See The Oil and Gas Journal, April 14, page 215; and June 9, page 55.)*

Porosity evaluation . . . The MicroLog, an instrument for the accurate determination of boundaries of permeable beds in a bore hole, makes possible the evaluation of porosity in many instances and is a help in the determination of fluid saturation, according to H. G. Doll, Schlumberger Well Surveying Corp.

Doll showed that by using interpretation charts established experimentally on laboratory models, the per cent porosity and the formation resistivity factor can be determined by entering values read on the MicroLog. He said that according to experience available to date good results are obtained in formations substantially free of conductive solids when the porosity of the formations is higher than 20 per cent, provided the mud cake does not exceed about 1 in.; and that fair determinations are still possible for lower values of porosity down to 15 per cent and even less, if the mud cake thickness does not go beyond ½ in. *(See The Oil and Gas Journal, September 1 and 8.)*

Two-state field . . . Phoenix Lake in the extreme southwest corner of Calcasieu Parish, Louisiana, extends across the boundary line between Louisiana and Texas.

R. M. Wilson, Ohio Oil Co., Shreveport, said this field was discovered following detailed gravity surveys and then seismic work which indicated a complexly faulted dome with axis slightly elongated northeast-southwest.

Wilson said that the well-formed gravity minimum of the type that it is indicates to him that the structure resulted from salt movement at depth and should be classified as a deep-seated dome. Wilson pointed out that a major problem exists in coordinating the conservation laws for Louisiana and Texas so that the reservoirs in each state can be developed and drained equitably.

It is in this field that directional drilling has resulted in a hole which started in Texas, drilled under a portion of Louisiana and was bottomed in Texas. *(See The Oil and Gas Journal, June 16, 1952.)*

MicroLog Limitation

Hydratable material may hinder mud-cake formation

CORPUS CHRISTI.—Though the micro-contact log has many effective uses in sand sections it is important to remember that it indicates only those formations which are permeable to drilling mud filtrate. In some instances it may give a negative indication through a sand that will produce oil, according to R. W. Garrett, Jr., Humble Oil & Refining Co., Corpus Christi.

At the Gulf Coast Association of Geological Societies' meeting held here November 6-8, Garrett said it has been found that micro-contact logs which are run through producing sands in the Jackson group in Duval County, Southwest Texas, may give no separation or negative separation in a part or all of the producing interval. The reason for this, he said, is possibly because no mud cake will form on a sand face that is impermeable to drilling mud filtrate due to the presence of hydratable material in the sand.

Garrett suggested the possibility that producing sands in other areas may also show negative separation and that interpretation of a micro-contact log should be made with reference to the S.P. curve on the conventional electric log.

Valuable uses . . . Garrett reported that apart from this problem, the Micro-Log has many valuable applications in Southwest Texas sand sections. He said it can be used for:

. . . Accurately determining net sand thickness.

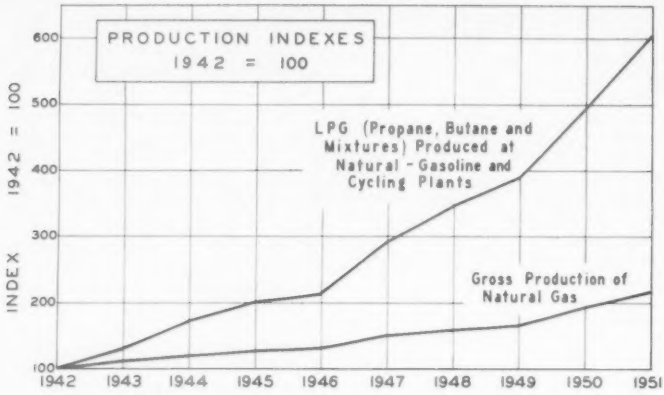
. . . Logging exact location and thickness of hard impervious streaks, a considerable aid in taking sidewall samples and correlating core records with electric logs.

. . . Selecting best sands for drill-stem testing, especially in a rat hole where sands that might otherwise be straddle-packer tested can be eliminated.

. . . Differentiating between lignite or hard streaks and gas or oil sands.

. . . Selective perforating of a permeable section isolated by hard impermeable streaks.

. . . Indicating the presence of hydratable material as a warning to any plans for water flooding with fresh water in a given sand.



L.P.G.'s Biggest Problem

Cheaper transportation is essential if the industry is to acquire new markets; production costs difficult to cut

John C. Casper

FUTURE increases in the rate of consumption of liquified petroleum gas comparable with the gains recorded since the end of the war will depend on cheaper transportation.

Trends over the past few years indicate that further rapid growth in the use of L.P.G. may bring it into competition with other fuels and raw materials which will call for delivered prices that are at least no higher than at present. To capture some of the possible markets, delivered prices may have to be reduced.

On the other hand, production changes in the past 5 years offer little encouragement for substantial reductions in production costs unless someone comes up with a new and better way for separating light liquids from natural gas.

The new and modern natural-gasoline and cycling plants built since the war are much more efficient than some of the old units, but the increased efficiency is offset by the fact that a larger percentage of current production is the harder-to-separate propane.

For the year 1946 production of L.P.G., exclusive of iso-butane and iso-pentane, was divided into 27 per cent propane, 28 per cent butane, and 45 per cent mixtures. By 1951 the proportions had shifted to 45 per cent propane, 22 per cent butane, and 33 per cent mixtures.

Propane must gain . . . The accompanying chart shows the relative growth of L.P.G. production compared with gross production of natural gas. The fact that production of L.P.G. has climbed much faster than total production of natural gas indicates that the extra expansion in L.P.G. output had to come about by more complete separation of light liquids from the gas.

If L.P.G. is to continue its expansion at a faster pace than natural gas, propane must represent a still larger portion of the total. Also, this additional propane will be harder to separate and will cost more than the propane now being produced.

Since there is little hope for important reductions in production costs, any cut in delivered prices will have to come through reduction in costs of distribution.

It is significant that the uses that furnish the better possibilities for rapid expansion depend on lower delivered prices.

District 3, which has 68.2 per cent of plant capacity to produce L.P.G. and accounts for about 57 per cent of all L.P.G. produced at refineries, used 90.8 per cent of all the L.P.G. that went into the production of synthetic rubber in 1951 and 64.3 per cent of that used by chemical companies. The growth of the petrochemical industry on the Gulf Coast has been due to lower cost raw material from nearby plants.

Several possibilities for lower transportation costs to other areas have been considered. The railroads may make a few rate adjustments but probably will not be able to work out any program with L.P.G. shippers that will provide large reductions in over-all shipping costs.

Pipe-line factors . . . Agreements have been reached that provide in-transit rates for the L.P.G. placed in underground storage during the summer months.

Some L.P.G. and natural gasoline is now moving by pipe line and many L. P. G. manufacturers feel that this type of transportation will increase materially in the future.

In general, there are two conditions which will influence the rate of expansion in movement of L.P.G. by pipe line: (1) A large year-round market with adequate distribution facilities and (2) plenty of high-pressure storage at terminals on the line.

One of the principal obstacles in planning extensive movement of L.P.G. by pipe line has been the fact that L.P.G. demands are not concentrated. Deliveries to L.P.G. customers start at points beyond the gas mains. Efficient and economical pipe line transportation depends on a high load factor and large deliveries to terminals. If the L.P.G. terminals on a line are sufficien ly far apart to permit large deliveries at the terminals, tank-car and truck-delivery distances from the terminal to bulk stations are long enough to offset a large part of saving on the pipe line movement from the producer to the terminal.

Steel storage is too expensive for large-scale seasonal accumulation of inventories at pipe-line terminal points. Underground storage would solve the problem if salt deposits were conveniently located all over the country. Mined caverns may be possible in some areas.

It has been suggested that the Gulf-East Coast products line planned by the United States Pipe Line Co. could move large quantities of L.P.G. from the Southwest to potential demand areas in the northeastern quar er of the country. The success of such use of the line would depend on the possibility of finding suitable conditions for underground storage along the route of the line.

Gas-line possibilities . . . Another possibili y for lower cost transportation of L.P.G. can be found in the long-distance gas-transmission lines that reach from the southwest to areas in the North, East, and Wes'.

The plant located on the Tennessee Gas Transmission Corp. line at Gabe,

Ky., in combination with the fractionating equipment of Mathieson Chemical Corp. has a total capacity of 9,050 bbl. daily including output of ethane and natural gasoline. The new plant of National Petro-Chemicals Corp. on the Panhandle Eastern line at Tuscola, Ill., will add to the capacity for this type of plant.

In both cases, the extraction plant functions as a source of supply of raw materials for a chemical plant with propane and butane taken out in the process of extracting ethane.

Some of the men in the L.P.G. industry who have studied this method believe that the present economics of such a system depends on the extraction and use of ethane which would call for a chemical plant.

The growth in the use of petroleum hydrocarbons as raw materials for chemical manufacture, makes it possible to use gas-transmission lines to transport at least part of the L.P.G. to meet the demands in areas where chemical plants located on large natural-gas lines will have a freight advantage.

Suppliers of L.P.G. will have a better chance of meeting all normal demands this winter than they did last year. Part of the difficulty last winter was a lack of product as much as a shortage of transportation. While it is true that most of the underground storage is in the Southwest near points of production, the additional inventories should make it possible to keep the products moving this winter except in the case of extremely cold weather.

WEST COAST

Big Refinery Planned

First major new plant in Puget Sound area to operate on Canadian crude oil to be built by General Petroleum Corp.

D. H. Stormont

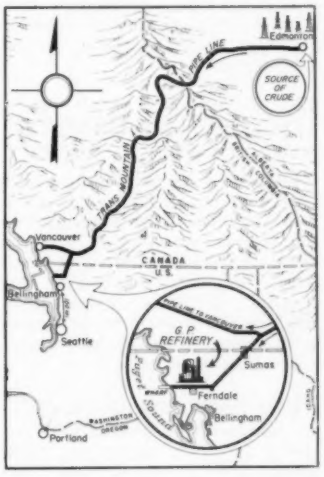
LOS ANGELES.—First large refinery in the Pacific Northwest to operate on crude brought by pipe line from Alberta will be a 35,000-bbl. plant of General Petroleum Corp. at Ferndale, Wash., 12 miles south of the Canadian border.

Plans for the $35,000,000 plant were announced here November 7 by R. L. Minckler, General Petroleum Corp. president. Construction will begin as soon as necessary permits are obtained from government agencies and engineering work is completed. Completion is set for late 1954.

To bring Alberta crude to the 850-acre plant site on Puget Sound, Trans Mountain Oil Pipe Line Co. will add a branch line to its 711-mile Edmonton-Vancouver line. As announced by Trans Mountain, the 30-mile, $2,750,000 extension will link with the main line at Sumas, B. C.

The new plant is being designed to operate on Redwater crude, which General Petroleum Corp. will obtain principally from Imperial Oil, Ltd. Neither the western affiliate of Socony-Vacuum Oil Co., Inc., nor the parent company has any interest in the Trans Mountain line now under construction. Socony's current Canadian crude production is about 400 bbl. daily.

Planned facilities . . . Process units to be built at Ferndale include a $3,000,000 crude distillation unit, a $3,500,000 Thermofor catalytic cracking unit, $1,700,000 catalytic polymerizer, $1,300,000 thermal gasoline reformer, and a $1,200,000 thermal cracker with vacuum distillation tower.



SITE OF General Petroleum's proposed refinery.

Estimated daily product output will be 16,300 bbl. of gasoline, 10,000 bbl. of diesel and stove oils, and 6,200 bbl. of residual fuel oil. Storage facilities for crude oil and products will total approximately 2,000,000 bbl.

Docking facilities capable of handling barges and large ocean-going tankers will be constructed so that bulk of the plant's output can be distributed by water throughout the Pacific Northwest. General Petroleum currently is supplying this market by tanker from its 125,000-bbl. Los Angeles refinery.

Contracts for engineering and construction of the refinery are being entered into with Bechtel Corp., San Francisco.

Extension line . . . As shown on the accompanying sketch map, feeder line for the new refinery will branch off from the main line at a point 4 miles northeast of Sumas, B. C. Plans call for laying a 24-in. line from this point to Laurel, Wash., 18 miles southwest. About 12 miles of 16-in. line then will be built from Laurel westward to the Puget Sound refinery site.

According to Trans Mountain, applications for the required permits are to be submitted immediately to Canadian and U. S. Government authorities. Contracts for design and construction of the extension will be awarded soon, with plans for it to be completed during 1953.

Northwest's demand . . . Completion of this new 35,000-bbl. refinery, plus new capacity being added at existing plants in the Vancouver, B. C., area, plus importation of more refined products by pipe line from Rocky Mountain refineries will do much to reduce the dependency of the Pacific Northwest on California crudes.

Current demand in this area, in terms of crude, is approximately 250,000 bbl. daily, of which about 40,000 bbl. is in the Vancouver area. By 1955 it is estimated demand will be about 300,000 bbl. daily. These totals are exclusive of the Pasco, Wash., area which is served by a products line from Salt Lake City.

When the Trans Mountain line is completed next fall 120,000 bbl. of Alberta crude will be available—either for processing in local refineries or for shipment by tanker to California refineries.

Refining situation . . . Current refining capacity in this region is about 44,000 bbl. daily, of which 29,000 bbl. is at three Vancouver plants. The remaining 15,000 bbl. of capacity is in three asphalt plants in Washington and Oregon. The latter probably will continue to be supplied by residual fuels or heavy crudes from California.

Construction to be completed by next fall at the Vancouver plants of Imperial Oil, Ltd., and Shell Oil Co. of Canada, Ltd., will increase refining capacity in this area to about 46,000 bbl. daily. Completion of General Petroleum's plant leaves approximately 40,000

bbl. of crude available for processing or transshipment. Enlargement of the Trans Mountain line to its ultimate capacity of 200,000 bbl. would increase this amount to 120,000 bbl.

The big question thus is whether this crude will be refined locally or be tankered to California plants.

Major-company executives believe that to be economic any new northwest plants should have a minimum daily capacity of 30,000 or 40,000 bbl. If a company's demand there cannot justify such a plant, they say, it will be cheaper to process the Alberta crude in California refineries.

In all likelihood, new plants will be added in the area either by major California companies or by independent groups. Both Union Oil Co. and Richfield Oil Corp. are reported to have such plans under consideration. Likewise last summer Standard Oil Co. of California purchased a 2,000-acre tract on Puget Sound in anticipation of building a refinery in the "next 2 years or 10 years."

Rocky Mountain refiners also are seeking more of the Pacific Northwest market, utilizing pipe lines to move refined products into the inland Spokane area.

Most recently announced project is a 600-mile, 8-in. line to be built by Continental Oil Co. from Billings to Spokane. This line is to have an ultimate capacity of 25,000 bbl. of refined products daily.

Salt Lake Pipe Line Co., a California Standard subsidiary, about 2 years ago completed a products line between Salt Lake City and Pasco, Wash. Currently a 330-mile 8-in. loop is being added between Salt Lake City and Boise to raise its capacity to 22,000 bbl. and an ultimate of 39,500 bbl. The company next year is to extend the line to Spokane, 120 miles northeast.

Long Beach Line Under Way

LONG BEACH, Calif.—Pipe laying has begun on a 14-in. natural-gas-transmission line from Huntington Beach oil fields to Long Beach.

The line will carry up to 20,000,000 cu. ft. daily into the city to bolster its shrinking output from oil wells. It is being laid from Signal Gas & Oil Co.'s absorption plant in Huntington Beach to Long Beach. Completion is expected by January 1, barring any difficulties in obtaining materials.

More Tidelands Funds Frozen

SACRAMENTO, Calif.—Another $2,323,813 in royalties from California's tidelands has been transferred reluctantly to the federal Government by State Controller Thomas Kuchel.

The total impounded in federal and state banks as a result of the 1947 Supreme Court decision giving the federal Government paramount rights to the disputed tidelands now stands at about $47,000,000.

In making the transfer, Kuchel said that "our sense of justice is offended, American history is overruled, and the people of this state lose what they ever believed to be their own property."

SOUTHWEST

Scurry-Unit Hearing Set

DALLAS.—Unit operation of Canyon Reef pool of Kelly-Snyder field and a portion of Diamond M field, Scurry County, Texas, comes up for hearing Thursday, November 13.

Sunray Oil Corp. and Magnolia Petroleum Corp., acting for the Scurry Area Canyon Reef Operators Committee, will present evidence before the Texas Railroad Commission in Austin.

If the commission approves the unitization agreements before the end of November, they will become effective on January 1. SACROC's program calls for both water and gas injection and is expected by engineers to result in recovery of an added 750,000,000 bbl. of oil beyond the primary production potential.

Imbibition Project Proposed

AUSTIN, Tex.—Tex Harvey Oil Co. has requested permission to initiate a pilot water-imbibition project in Tex Harvey field of the Spraberry trend.

This project would include an area of 1,600 acres and would be similar to the imbibition project recently approved by the Texas Railroad Commission for Atlantic Refining Co. in Driver Spraberry field.

Originally the project was scheduled to involve 9 sections but that area was reduced to the 1,600 acres. The area includes all wells within 1 mile of the injection wells. Three of these were requested, into which 200 bbl. of water per day would be injected. This amount would be reduced if an adverse affect was observed in neighboring wells.

The plan seeks removal of gas-oil ratio restrictions on wells in the area and the granting of a lease allowable rather than a per well allowable in that area. All gas would be processed in plants of Tex Harvey Gasoline Co. or Phillips Petroleum Co.

The proposed project received support from Ted Weiner & Associates, and from Atlantic Refining Co. It was opposed by The Texas Co., Phillips Petroleum Co., Tide Water Associated Oil Co., and Magnolia Petroleum Co. Removal of gas limitations was one of the primary objections.

Industry Briefs

TULSA.—Midco Oil Corp., headed by C. C. Toomey, has been dissolved. The action followed dismissal by Federal Judge Royce Savage of a suit brought by a minority group of stockholders to prevent dissolution. The company, 78 per cent owned by Toomey and his family, has production in Oklahoma and undeveloped acreage in Oklahoma and Texas.

NEW YORK.—The third edition of the Bulletin on Recommended Practices in the Setting, Connecting, Maintenance, and Operation of Lease Tanks has been issued by the American Petroleum Institute. Copies may be obtained for 25 cents from J. A. McNally, A.P.I., 50 West Fiftieth Street, New York. The edition was prepared by a Division of Transportation subcommittee headed by R. Charles Nicholson, Shell Pipe Line Corp.

WASHINGTON.—Oil operators building foreign projects approved by the Petroleum Administration for Defense will hereafter file progress reports quarterly instead of monthly. The first report on the new basis will be due January 15. Heretofore, operators have been required to file monthly reports so that PAD could follow closely the course of construction.

TULSA. — Water-flooding of Quapaw pool in Osage County, Oklahoma, may develop an additional 8,000,000 bbl. of oil, according to estimates of engineers of the Bureau of Mines in a just-released report. So far, as a result of unrestricted production in the early days of the pool, only about 35 per cent of the original oil in place has been recovered—8,486,946 bbl. to January 1, 1952. The study of water flooding, undertaken in cooperation with the State of Oklahoma, indicates that 50 per cent of the oil remaining in the reservoir should be recoverable by an efficient program.

LOS ANGELES.—Southern California Petroleum Corp. has acquired all of the stock of Culbertson & Irwin, Inc., and plans to dissolve the company and merge its assets into the parent company. Culbertson & Irwin is a producing company with wide holdings in New Mexico.

Aim of the Cartel Case

Justice Department's goal is "reconstruction" of the oil industry; Aramco appears as first major target in suits

Bertram F. Linz

WASHINGTON. — "Reconstruction" of the industry is the now-disclosed objective of the Department of Justice in its grand jury investigation of an alleged international oil cartel.

Just how this would be accomplished has not yet been made clear, but one department official indicated that a major step might be to force Arabian American Oil Co. to make available to any and all comers the output now divided between the four companies which own Aramco—Standard Oil Co. (Calif.), The Texas Co., Standard Oil Co. (N. J.), and Socony-Vacuum Oil Co.

Aramco thus appears to be a major target in the investigation but so far, at least, there has been no open suggestion the Government is prepared to go so far as to demand dissolution or divorcement of any present arrangements between the companies.

Meanwhile, argument on the validity and scope of the department's subpoenas for the presentation of documents and records, suspended over election day, resumed before Judge James R. Kirkland in the District of Columbia federal court November 6. Prior to suspending the hearings, Kirkland had ruled that the January 1, 1928, date for the starting point of the investigation was too remote and ordered it advanced to January 1, 1941, but there are still a half-dozen points on which he has been asked to rule.

Points in question . . . Points on which the companies are fighting the subpoenas include the scope of the records to be produced, the definiteness of the subpoenas, and whether the records demanded are relevant to the investigation. Also to be settled are the questions whether the companies must submit the records of their subsidiaries or affiliates, whether some of the records are privileged and, finally, the point of jurisdiction.

The companies already have appealed to the Supreme Court from Kirkland's decision, affirmed by the Court of Appeals, not to dismiss the grand jury or transfer the case to New York.

Whether the Government will appeal from Kirkland's ruling to slash the period covered by the subpoenas or other adverse rulings he may hand down has not been disclosed but unless it is severely handicapped it is believed the department will let the matter rest, particularly as Kirkland said it could secure any specific records prior to 1941 by additional subpoenas.

Government's argument . . . Forced by the pressure of company argument to disclose some of the bases for the government's case, Leonard J. Emmerglick, special assistant to the Attorney General making the department's argument, charged an international cartel is imperiling the national security by making the United States dependent upon foreign oil.

"The cartel arrangements of these companies have brought it about that this country is dependent upon foreign sources for our oil," he asserted. "Independent producers in this country no longer have any incentive to develop local fields."

These agreements, Emmerglick told the court, have jeopardized our national security.

"That holding down of capacity stunned us when Pearl Harbor was attacked and we should have learned a lesson from it," he declared.

Emmerglick charged also that a Senate committee investigating purchases of oil by the Navy found "the Navy was grossly overcharged" and uniform prices were repeatedly quoted in bids.

The shortage of aviation gasoline during the oil strike last spring also was attributed to the "concentration of business" among a few firms.

Emmerglick also decried the shutdown of Iranian production, declaring "Iran is so important to us because these companies through their agreements made us dependent on Iran."

Reconstruction plans . . . Department officials have been vague about the machinery for "reconstructing" the foreign oil industry. They have hinted it might be accomplished without legislation, apparently on the ground that if the projected grand jury investigation results in criminal indictments, the government will have a lot of bargaining power to induce the companies to make changes in their policies.

It was not clear whether "reconstruction" would stop at forcing Aramco to sell oil to all comers or would extend to modification of company policies in other areas.

The preliminary maneuvers in the District Court are expected to wind up this week.

Industry Expanding

Value of DPA certificates nearing 3 billion dollars

WASHINGTON. — The expansion program of the oil and gas industry is reaching toward a $3,000,000,000 investment in plant and facilities.

A summary of the activities of the Defense Production Administration discloses that up to September 30 approval had been given to 890 projects with an estimated total investment of $2,556,347,000, on which certificates of necessity had been issued for the accelerated amortization of $1,248,647,000.

In addition, DPA had pending another 138 applications involving the proposed investment of $531,368,000.

Although the number of certificates issued for oil and gas expansion is

	Granted			Pending	
	No.	Proposed investment (thousands of dollars)	Amortization allowed	No.	Proposed investment (thousands of dollars)
Crude petroleum	4	6,154	5,143	1	536
Natural gas	19	32,854	13,186	3	12,323
Natural gasoline	117	224,980	136,408	12	16,303
Oil and gas drilling	1	5,558	1,261		
Field contract services				1	120
Petroleum refining	320	1,321,667	832,170	40	182,623
Lubricants	5	4,365	2,582	2	710
Oil-field equipment	9	2,016	1,176	3	285
Crude pipe lines	58	252,951	60,502	9	166,388
Product pipe lines	54	290,263	71,007	10	25,374
Gas transmission	20	158,757	40,084	5	82,049
Gas transmission and distribution	9	34,213	8,923	1	228
Natural-gas distribution	11	113,985	28,414	3	1,076
Petroleum bulk stations	263	108,584	47,791	48	43,353
Total	890	2,556,347	1,248,647	138	531,368

WATCHING WASHINGTON

Bertram F. Linz

Some Heels Are Dragging

The Federal Trade Commission appears to the oil industry to be a pretty aggressive outfit, but according to Rep. Wright Patman of Texas it is dragging its heels in enforcing the antitrust laws and particularly the Robinson-Patman Act.

A sharp split has developed within the FTC where, Patman alleged, opponents of the act have established artificial lines of authority to circumvent those officials within the commission favoring strong enforcement. The chief protagonist of this current of hostility toward the act, he charged, is Com. Lowell B. Mason.

The basis of the fight within the commission is the Supreme Court decision in the Standard Oil Co. (Ind.) case, declaring good faith to be a complete defense against a charge of price discrimination.

Patman pointed out that bills to write the court's decision into law passed the Senate but were not considered by the House, although favorably reported, and predicted that another attempt to enact the legislation will be made next year.

Getting in the Act

Interest in development of synthetic liquid fuels seems to have seeped from the Interior Department over to the Defense Production Administration.

At DPA, busy preparing programs for expansion of vital industries through 1955, the idea appears to have been developed that synthetic fuels should be included, and the Bureau of Mines has been asked to submit a program covering coal, oil shale, and natural-gas development over the next 3 years.

Just how DPA could "expand" the now nonexistent commercial production of liquid fuels from coal and shale has not been made clear. It could, of course, grant certificates of necessity for accelerated amortization of investments in plants and there are funds from which government loans may be made, as well as Reconstruction Finance Corporation help. There also is provision in the Defense Production Act for government construction of plants.

Most of the present programs for adding to the productive facilities of the country will be completed within the next 14 months, but DPA officials believe they will not be adequate to meet requirements of defense and the civilian economy. Accordingly, it has established a list of 254 industries in which production must be further increased over the next 3 years, including both domestic and foreign petroleum, gas pipe lines, and tankers.

These programs are split into two groups, one for partial mobilization in which goals will be set at the level of supply necessary to support the currently projected military-preparedness program, including stockpile requirements, plus unrestricted civilian consumption after 1953. For the other group, involving the most critical strategic materials, goals are on the basis of full mobilization, representing the extent to which prospective supply or capacity would be insufficient to meet annual requirements for an assumed 5-year war.

American Capital Shy

Developments of the past 2 years, at home and abroad, have tended to make American capital shy of foreign investment despite all efforts of the administration to encourage new ventures in foreign lands.

American investments and lower tariffs have been the major steps seen necessary by the administration to put the other countries of the free world on a sound economic footing, the first by developing new industries abroad and the second by opening the American market wider to foreign products.

The need for greater investment was stressed only a few weeks ago by the President's special representative in Europe, Ambassador William H. Draper, Jr. More recently, however, Robert C. Turner, a member of the President's council of economic advisers, practically wiped it out as a factor over the next decade or more.

Abroad, Turner said, the political stability of many of the underdeveloped countries is quite precarious, and in others the existence of nationalistic legislation makes investment unattractive.

less than 7 per cent of the total of 13,802 granted all industry, the investment involved is more than 10 per cent of the $23,250,796,000 on which quick write-off of $13,580,068,000 has been authorized.

More than half of the proposed expansion is, of course, in refining, for which 320 projects have been approved involving a total of $1,321,667,000. But there also are 117 natural-gasoline projects involving $224,980,000; 58 crude pipe lines to cost $252,951,000; 54 product lines to cost $290,263,000; and 20 natural-gas transmission lines to cost $158,757,000.

Details of the applications from the various branches of the industry granted and pending are shown in the accompanying table.

TEL Program Announced

WASHINGTON. — The Defense Production Administration announced a program last week to bring capacity for the production of tetraethyl lead to 570,000,000 lb. a year by January 1, 1954.

This capacity would represent an expansion of 150,000,000 lb. over the 420,000,000 lb. existing in 1951, officials said, and sufficient tax amortization projects already have been approved to fill the goal.

The TEL program was one of 10 new programs announced by DPA. At the same time, the agency disclosed that the supply situation continues to improve in many fields of raw materials, although aluminum will continue to be tight for some time because of drought in the Pacific Northwest and Tennessee Valley.

Sulfur Restrictions Removed

WASHINGTON.—All controls on the use of sulfur, including limitations on inventories, have been repealed by the National Production Authority.

NPA officials said supply has now caught up with demand and the inventory position has improved, largely because actual consumption fell below authorized use during the first eight months of the year.

The revoked order had limited the consumption of sulfur to 90 per cent of 1950 usage. Restrictions on sulfuric acid were revoked last month.

Estimated domestic consumption of sulfur plus exports in all forms except spent sulfuric acid is expected to total 6,090,000 long tons this year as compared with estimated production plus imports of 6,524,000 tons.

HEADING UP the Rocky Mountain Oil and Gas Association next year will be (left to right): R. S. Shannon, Jr., Pioneer Oil Co., Denver, new vice president for Colorado and Nebraska; A. F. Barrett, General Petroleum Co., Casper, Wyo., reelected vice president for Wyoming; H. B. Gernert, Trigood Oil Co., Casper, new president; Charles S. Hill, Denver independent operator, retiring president; Walter G. Davis, Casper independent operator, reelected treasurer; W. M. Saxon, Pure Oil Co., Billings, Mont., reelected vice president for Montana and South Dakota; and J. L. Dougan, Equity Oil Corp., Salt Lake City, reelected vice president for Utah and Idaho.

Federal Policies Hit

Interference, controls, political attacks threaten free world's advantage over Russia, Rocky Mountain men told

Robert J. Enright

DENVER.—Federal public-lands policies, investigations of the oil industry, and price controls came under heavy fire at the seventh annual convention of the Rocky Mountain Oil and Gas Association here October 30-November 1.

Dissatisfaction with increasing intervention by Government in operations of the petroleum industry was voiced by nearly every speaker during the 3-day meeting.

Attendance, reported in excess of 1,200, topped all records by far.

The government's recent campaign against seven major oil companies operating abroad in which the companies were accused of conspiring to form an international oil cartel, was condemned vigorously by executives of both large and small oil firms.

Keynote Speaker B. Brewster Jennings, president of Socony-Vacuum Oil Co., Inc., New York, said the government charges involve a "threat to all of us," because they are in reality attacks on private enterprise and because they threaten the Free World's 11-to-1 ratio of oil superiority over Russia.

The current grand jury investigation and the civil suits by the Mutual Security Agency are a political hoax, he said. They were intended to create the impression in the public mind that where there's so much smoke, there must be fire.

Effects abroad . . . Socony-Vacuum, Jennings declared, has maintained the same price to all buyers of Middle East crude. "We have discriminated against no one. We are confident of eventual acquittal, but in the meantime what will happen?"

Practically all of the European countries to which Socony sells Middle East crude, he said, now are experiencing dollar-exchange difficulties. A big share of the dollars they must spend goes for oil. It is not hard then to anticipate pate their reaction to charges that Socony is guilty of wrongdoing and is perhaps crooked, Jennings said. "This should make the Kremlin very happy."

"No one challenges the right or duty of our Government to investigate our industry or any other. At issue is the question whether such ill-considered attacks as those recently made against us amount to burning down the house to drive out rats which have not been—and we think will not be—shown to exist. The so-called Federal Trade Commission report did not say 'alleged' international oil cartel. It called the international oil cartel just as it were already proved. This was a flagrant assumption of guilt without trial."

Middle East vital . . . It has been proved by World War II and the postwar period, Jennings said, that it is in the national interest to look for and develop foreign production. We are no longer a net exporter of oil; the Western Hemisphere is producing only about enough oil for its own needs.

"Whereas we used to furnish nearly all of Europe's requirements, about 75 per cent of all oil used there today is supplied by the wells of the Middle East. This percentage may increase to almost 90 per cent in 2 years. If the Russians could cut off a substantial portion of this flow of oil by upsetting concessions of the American oil companies in the Middle East, we would face either:

. . . Rationing ourselves in the West to supply the essential needs of our friends in Europe, or

. . . Letting Europe try to get along without oil.

"If we did the latter, we should be opening the door for Russia to walk in because western Europe's military and industrial machine depends on an adequate oil supply. The billions the American Government has spent there already would be money down the drain or even worse, because the Russians then could take over, perhaps without a shot, the factories we have helped to rebuild and the military equipment we have helped to buy. We would be junking the Marshall plan, the North Atlantic Treaty organization, and all the work and treasure we have put into them.

"These are not pipe dreams; they can happen, and the possibility of such a disaster has been greatly expedited by the recent actions of the Government of the United States."

Small-company support . . . Bernard L. Majewski, president of Great American Oil Co., Chicago, agreed with Jennings.

Majewski, a self-styled "small independent oil man," said the government attack on the large oil companies for alleged cartel policies is "an election issue and a downright fraud."

"I'm not worried about the big companies, they can take care of themselves." However, this isn't just an isolated case of persecution, Majewski said, it is a threat to every business in the country, large or small.

Deception alleged . . . The so-called tidelands are a long way from the Rocky Mountains, Price Daniel, attorney general of Texas and U. S. senator elect, told the convention. But the issues vitally concern every state in the union.

President Truman, Daniel declared, is "deliberately deceiving the people of

the nation by saying that the federal tidelands steal involves only Texas, California, and Louisiana." The truth, he said, is that every state has rivers, lakes, or tidewaters with resources of great present or potential value. All state ownership and control of this type of property "has been clouded by the federal tidelands claims," he said.

Daniel said the bill vetoed twice by the President applied to every state and was supported by the governors and attorneys general of 44 states. "Furthermore," he said, "this type of federal seizure under 'paramount rights' is a first cousin to Truman's theory of 'inherent powers' under which he attempted to seize the steel industry."

Controls hit . . . The Office of Price Stabilization and OPS Administrator Tighe Woods came in for their share of brickbats during the meeting.

Guest speaker, Russell B. Brown, general counsel of the Independent Petroleum Association of America, attacked OPS for trying to handle legislative and administrative price-control functions and messing up both.

Recent government action, he said, is endangering all three of the "rights" which must exist for an oil company to operate successfully. These are: (1) the right to explore and produce, (2) the right to a market outlet, and (3) the right to conduct operations in a proper government atmosphere.

It is hard to see, Brown said, why the Government attacks in so many ways an industry which is so vital to defense.

Costs of producing oil are climbing every day, while the price for oil remains the same. Oil, in effect, he said, is paying a major share of the pay increase recently granted the steel workers, since the Government allowed the steel industry to pass on the resulting increased price of steel.

Turning to imports, Brown said that it is vital that maximum effort to development of reserve oil-producing capacity be concentrated here in the United States. This capacity cannot be developed on short notice when war comes, he said. It must be here. Foreign reserves, upon which we are depending more and more, are exposed to enemy attack and could easily be cut off.

What has been done . . . Spokesmen for R.M.O.G.A. legislative, public lands, and legal committees told the convention that the association's drive for more favorable federal and state legislation is getting results.

Here, in part, is what has been accomplished. The association has:

. . . Persuaded the Montana state government to consent to organization of federal units.

. . . Secured the right to conduct seismograph operations on state lands in Montana.

. . . Drafted a bill to amend the Montana leasing status to change the present fixed lease term to one which will extend for 10 years and as long thereafter as oil or gas is produced.

. . . Launched a study of the Carey Act land situation in Wyoming in an effort to open these areas for oil and gas operations.

. . . Drafted a proposed conservation law for Montana and is now working on a law for Utah—both of which closely resemble those of Colorado and Wyoming.

. . . Finished work on an amendment to Section 17 of the Federal Leasing act which would extend all federal leases committed to a unit agreement if there is a discovery within the unit during the term of the lease.

. . . Drafted an amendment to Section 6 of the Crow Indian Leasing Act providing that the present fixed lease term be changed to run for 10 years and as long thereafter as oil or gas is produced.

. . . Worked out an amendment to the South Dakota conservation law to include provision for spacing and forced pooling of drilling units.

. . . Set up committees to (1) consider repeal of the Right-of-Way Leasing Act of 1930, (2) work on underground-gas-storage legislation in Nebraska, (3) review development of underground-gas-storage legislation in Montana, and (4) to work with other associations to amend the mining laws to eliminate title problems arising as a result of the thousands of old placer claims on public lands.

Shale-Oil Costs

Research is cutting into price gap, R.M.O.G.A. told

DENVER.—The latest estimates on cost of producing fuels from shale oil show that the price gap between these fuels and those refined from petroleum is narrowing.

Boyd Guthrie, chief of the Bureau of Mines' shale-oil research project at Rifle, Colo., and widely recognized as the nation's foremost expert in this field, told oil men attending the Rocky Mountain Oil and Gas Association convention here that progress in research at Rifle has cut deeply into costs of producing and refining shale oil.

The Bureau now estimates that a shale-oil plant with a capacity of 250,000 bbl. daily could realize a return on investment of approximately 8 to 11 per cent.

This estimate, he said, takes into account all costs, tangible and intangible, except for payment of royalty for the shale-mining operation. It was based on the premise that products would be marketed in the Los Angeles basin at prices now existing there.

Capital needs . . . Total capital requirements for manufacturing 250,000 bbl. of shale oil daily using presently available refining equipment was placed by Guthrie at $872,150,000.

This operation assumes mining by the two-level method, retorting by gas combustion, visbreaking the crude shale oil in Colorado, and shipping it to California refineries for thermal cracking, cat refining and polymerization, and acid treating.

Another approach, more costly but which would result in a higher return on investment and in production of better-grade products, would involve using new processing equipment not now available, Guthrie said. Here the shale oil would undergo thermal cracking to coke and mild hydrogenation in Colorado. The hydrogenated distillate would be shipped to California for catalytic cracking and polymerization. Cost of producing 250,000 bbl. daily, assuming these circumstances, Guthrie estimated at $1,184,950,000.

Not yet competitive . . . Shale oil at present definitely is not competitive with petroleum, Guthrie said. The minimum return on investment generally regarded as necessary to build a commercial plant is 15 per cent. This, he said, currently is out of reach.

The research program at Rifle, he emphasized, is not intended to set up an industry in competition with petroleum. It is being carried out only with the idea that the oil industry will have accurate information available on processing shale oil when it becomes necessary to supplement petroleum products with something else. It is anybody's guess when this will be, Guthrie said.

Companies Split

Three majors intervene in Rangely repressuring unit

DENVER.—Three major producers in Rangely field have intervened in support of the Colorado Oil and Gas Conservation Commission in the lawsuit challenging the validity of the commission's Rangely repressuring order.

They are The California Co., Stanolind Oil & Gas Co., and Phillips Petroleum Co., which together produce about three-fourths of Rangely's output of approximately 60,000 bbl. daily.

The commission's order, scheduled to go into effect January 1, 1953, requires reinjection of gas to maintain reservoir pressure and has been estimated to increase ultimate recovery of oil by 30 to 87 million barrels.

The order has been attacked in the state courts by The Texas Co. for itself and as operator of Rangely leases of Union Pacific Railroad, and by Sharples Oil Co. These three concerns hold leases near the top of the structure and they maintain that gas injection will drive the oil down the flank rather than increasing ultimate recovery.

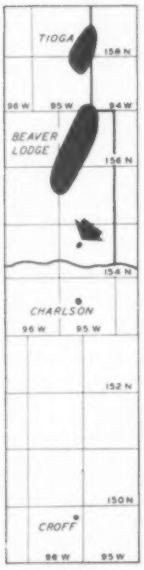
In support of the order, the California, Stanolind, and Phillips companies told the court that operators in the field are proceeding with plans to begin repressuring and are already installing compressors and other surface equipment.

Amerada Hits Again

Fifth oil pool opened on big North Dakota anticline

WILLISTON, N. D.—Amerada Petroleum Corp. has opened its fifth new oil pool in North Dakota.

The company's 1 North Dakota "E," (arrowed on map) in CNW NW 16-154n-95w, located midway between Beaver Lodge pool in Williams County and Charlson pool in McKenzie County, flowed 124 bbl. of oil and 71 bbl. of water in 18 hours through an 18/64-in. choke from the Madison at 8,674-9,720 ft. Gas flow was 162,000 cu. ft. on test.



Situated on Amerada's Hofflund prospect, the new discovery gives more evidence that production will be developed on a number of "bubbles" superimposed on the tremendous Nesson anticline.

Production now extends south from the original North Dakota discovery in Williams County into McKenzie County and east into Mountrail County.

Anticlinal production . . . Production in the state is still limited to the Nesson anticline; however, to the southwest about 180 miles Deep Rock Oil Corp. has found oil shows in its Slope County wildcat on several tests, indicating the possibility of production off the anticline.

North Dakota now has 66 producing oil wells in the five pools found. Beaver Lodge leads with 45, while Tioga runs second with 18. Croff, Charlson, and the new Hofflund each has one. Production averages 6,500 bbl. daily.

The most prominent known structural feature in North Dakota is the Nesson anticline. The surface-expressed portion of the structure is 30 miles long and 20 miles wide, and the distance between the northernmost well and southernmost well at present is about 55 miles. The northern end of the anticline is covered by glacial drift, and geophysical studies of that portion have yet to be checked with the drill.

All producing wells in the state to date have been completed in the Madison though several of the few wells carried deep enough to check the Devonian found it productive. Some edge wells were found dry in the Madison. The ultimate size of Beaver Lodge is expected to be between 22,000 and 25,000 productive acres.

CANADA

Products Line Operating

MONTREAL. — Products now are moving at the rate of 40,000 bbl. daily through Canada's newest pipe line, running 450 miles from Montreal to Hamilton, Ont.

Engineers opened valves of the $20,000,000 line last week at the refineries here of McColl-Frontenac Oil Co., Ltd., which built the line jointly with Shell Oil Co. of Canada, Ltd., and British American Oil Co., Ltd.

The line will move products to Ontario during the 5 months that lake shipping is shut down. If necessary, its flow can be reversed to bring crude from Western Canada to refineries here.

Refinery Expansion Planned

TORONTO.—Plans for an $8,000,000 expansion program at the Clarkson, Ont., refinery of British American Oil Co., Ltd., were announced last week by Ole Berg, Jr., president.

Berg said a catalytic cracking unit, a catalytic polymerization unit, and gas concentration and other facilities will be installed. At present the refinery has a crude-charging capacity of 17,000 bbl. daily. Thermal cracking capacity is 4,500 bbl.

The Clarkson project will be the fourth major expansion of British American refineries within the past 5 years. During that period, new cat crackers have been installed at Montreal East, Edmonton, and Moose Jaw.

Manitoba Crude Moving

CALGARY, Alta.—Interprovincial Pipe Line Co. now is shipping between 200 and 300 bbl. daily of crude from Virden field in Manitoba.

This marks the first crude produced outside Alberta to enter the line in commercial quantity since the carrier was completed in 1950. Potential rate of flow of crude produced at Virden currently is 700 bbl.

The oil is being trucked from the field to Cromer, southwest of Virden, by Standard Oil Co. of California.

Amurex Buys Oil Acreage

CALGARY, Alta. — Canada Southern Oils, Ltd., has revealed the sale to Amurex Oil Development Co., affiliate of Ashland Refining Co., of an undivided 50 per cent interest in more than 500,000 acres of Canada Southern properties in southwestern Saskatchewan. The agreement involves expenditure of $1,500,000 by Amurex for drilling and exploration and a payment of $30,000,000 in oil.

Cecil V. Hagen, Canada Southern president, said Amurex will spend $1,500,000 in geophysical work and exploratory drilling. Plans call for 10 wells, 4 of which will be deep tests.

Petroleum Rights Acquired

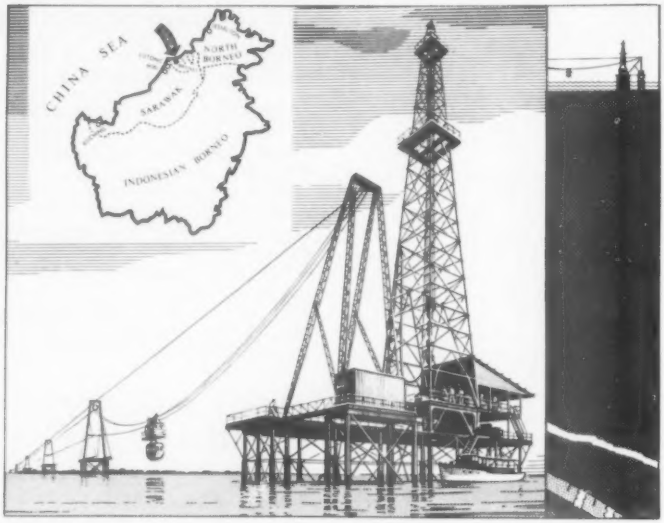
TORONTO. — New Devon Petroleums, Ltd., and associates have negotiated an agreement with Imperial Oil, Ltd., for a percentage of oil and gas rights on eight sections (5,120 acres) in the East Pemukan area of Alberta.

If commercial oil production is obtained, New Devon will get the rights on eight quarter-sections (1,280 acres) with Imperial retaining the balance. In event of commercial gas production, New Devon will hold all eight sections, with an overriding royalty going to Imperial. First well, 1 Wampum New Devon, already has been staked.

Plant Site Purchased

EDMONTON. — Barcam Oil Co., Ltd., has acquired 463 acres for the site of a new $8,000,000 gas-absorption plant near here.

The site reportedly cost $250,000. Location of the tract is 1 mile north of Canadian Chemical Co.'s $55,000,000 petrochemical plant now under construction.



ARTIST'S SKETCH of the offshore operation in British Borneo (Photo courtesy Shell Oil Co.).

FAR EAST

Drilling Off Borneo

Royal Dutch-Shell readies platform for first major test in South China Sea; supplies will reach rig by aerial ropeway

Dahl M. Duff

ROYAL DUTCH-SHELL has completed construction of a drilling platform for its first major test in the South China Sea about a mile off the coast of British Borneo.

An unusual feature of the operation is an aerial ropeway connecting the drilling platform with the shore. It can carry up to 5 tons of materials and equipment and includes a transporter car for personnel.

The offshore well, the first in the British Commonwealth, is being drilled in the hope of extending Seria field. Previously deviated wells have been drilled from the beach and off small platforms erected in shallow water near the shore.

Seria ranks as the most productive field in British territory. Currently, its output is about 100,000 bbl. daily. It is located in Brunei and operated by Shell's British Malayan Petroleum Co., Ltd.

Platform operation . . . The platform and other construction for the offshore well have been completed and the derrick moved into position. Drilling is expected to be under way in the near future using an Ideal 50 rig supplied by Oilwell Equipment Co. Four holes can be drilled from the single platform location.

The 110 by 45-ft. platform, capable of supporting up to 200 tons, has a foundation consisting of 28 vertical steel guide piles 24 in. in diameter. The structure was prefabricated in harbor and towed out to the location which is in about 30 ft. of water. The tubular steel jacket holding the guide piles was lowered to the seabed by means of winches. Steel bearing piles were inserted in the guide piles and driven down to obtain requisite bearing. Four raking piles were incorporated for additional stability and strength.

The aerial ropeway was decided on because of the special problems of access to the platform during the long periods of stormy weather encountered in the region.

The ropeway is supported on smaller structures placed at 840-ft. intervals along the route. Each of these consists of a smaller jacket and is anchored by four bearing piles.

Company engineers designed the steel structures and the drilling platform. Dutch and British firms supplied the equipment and carried out construction under supervision of the local Shell staff.

EUROPE

Fawley Expansion

Plant output will be hiked 10,000 bbl. daily in 1953

EUROPE'S largest refinery, the Fawley, England, plant of Esso Petroleum Co., Ltd., recently completed its first full year of operation with construction continuing on additional facilities to expand and improve the line of products.

The refinery was officially opened September 14, 1951, and went on stream fully in November. In the past year it has processed approximately 6,000,000 tons of crude oil (120,000 bbl. daily). Total production includes 1,750,000 tons of motor fuel, 300,000 tons of kerosine, and 3,500,000 tons of gas oils and fuel oils, according to a company announcement in London.

The second phase of expansion at Fawley will continue over the next year. During 1953, the refinery is expected to handle about 6,500,000 tons or about 130,000 bbl. daily of Middle East crude.

New facilities. . . . A new polymerization plant was completed last month, a tractor-fuel plant will be completed next April, sulfur-recovery facilities in June, and the lubricating-oil manufacturing plant in September. The whole project will have cost £37,500,000, equivalent to $105,000,000.

About 84 per cent of the products are being distributed in Britain, the company said. Fawley's output has been of importance in meeting the loss of the Iranian products. Furthermore, it helped augment Britain's earnings of foreign currencies in that about 1,000,000 tons of products, or about 20,000 bbl. daily, was sold in export markets.

Allowing for the dollar content of the crude oil purchased for the refinery, the company estimates the operations at Fawley will have saved Britain some $80,000,000 during the first year. This will increase to more than $100,000,000

in 1953 because of the scheduled greater production.

Kent Plant Near Completion

Operations at the new Kent refinery of Anglo-Iranian Oil Co., Ltd., in England are scheduled to start in mid-November.

At the end of October, A.I.O.C.'s 28,000-ton tanker, British Skill, moored at one of the new jetties to deliver a cargo of Kuwait crude which will be used for the initial operations.

The refinery will eventually have a capacity of about 80,000 bbl. daily.

MIDDLE EAST

Negotiations Over

Britain, U.S. to abandon efforts for Iranian pact

NO further British-American efforts to reach a settlement of the oil issue with Iran are expected—at least in the near future.

The last approach, initiated in August with the joint Truman - Churchill offer, boomeranged into a break of diplomatic relations between Iran and Britain. The British diplomatic representative in Teheran and the embassy staff have packed up and left the country, while Iran has withdrawn its officials from London.

Although Iranian Prime Minister Mossadegh engineered the break Britain's charge d'affaires in Teheran, George Middleton, refused to accept another Iranian message in which Iran again blamed the British for the deadlock leading to the break. The British also refused an Iranian offer to keep a British consul in Iran to maintain liaison with the Swiss who are handling Britain's affairs.

Threat still goes . . . The chances of any agreement which would allow large-scale resumption of operations of the Iranian oil industry now seem worse than at any time in the 19 months since Iran nationalized the British - owned properties. Britain, for its part, has indicated it will continue to lay legal claim to any oil which may be exported from the company's former concession.

While the United States Government has been, and still is, anxious to end the stalemate for fear of Communist coup in Iran, some observers believe there may be a disposition to let things ride as they are a while.

In neighboring Iraq, the four opposition parties have decided to boycott the coming elections because of the government's insistence on holding it in two stages. A new oil agreement, considered to be the best in the Middle East, was ratified by the Iraq Parliament early this year for Iraq Petroleum Co., Ltd., but the current political clamor is giving rise to new attacks on the government and left-wing agitation for a state-owned industry.

Yemen Concessions Rumored

Offers for oil concessions from several companies are under consideration by the government of Yemen.

The Yemen foreign minister said in London that his government may eventually come to an agreement with the group offering "the most adequate arrangements." He refused to identify the companies.

Yemen is a 75,000-sq. mile kingdom at the southwestern corner of the Arabian Peninsula. Some interest in its prospects was shown in the industry several years ago, but no concessions materialized.

LATIN AMERICA

Purchase of Stock Denied

Sinclair Oil Corp. last week denied it has any present intention of buying the minority stock of Venezuelan Petroleum Co. Sinclair now owns 86.5 per cent of Venezuelan Petroleum, which produces about 10,600 bbl. daily in Eastern Venezuela and has a refinery at Puerto La Cruz.

Sinclair said it had not purchased directly or indirectly any shares of Venezuelan Petroleum for more than 5 years. "For some time, Sinclair has been giving consideration to the possibility, and only the possibility, of simplifying the corporate relationships between the two companies," the Sinclair statement said. "Sinclair has suggested that it is willing to cooperate with an independent committee of Venezuelan Petroleum stockholders which might be organized if they should wish to undertake a study of the affairs of Venezuelan Petroleum Co."

Ecuador Wildcat Hits Gas

Manabi Exploration Co., Inc., has brought in a gas producer on concession acreage about 5 miles southeast of Santo Tamos field on the Santa Elena Peninsula in Ecuador.

The well, 1 Filomena, a wildcat operation, tested in excess of 5,000,000 cu. ft. daily from a 32-ft. section of the Socorro formation at a depth of 1,060 ft. A rig is being moved in for further drilling in an effort to obtain oil production from the structure. Santo Tamos field produces about 3,000 bbl. daily of 35°-gravity crude from the same formation as the new gas discovery.

Cecil V. Hagen, president of Manabi, a subsidiary of Canada Southern Oils, Ltd., said the new producer is of considerable significance to Manabi, since the company now has a gas-absorption plant under construction in the area and scheduled for completion in December.

Officials of International Petroleum Co., Lima, Peru, are shown above as they received invitations to the International Petroleum Exposition, to be held in Tulsa May 14-23, 1953. Extending the invitations was Oscar Irizarry (second from right), editor of Petroleo Interamericano, an affiliate publication of The Oil and Gas Journal. Left to right are: A. L. Bell, manager of exploration operations; Paul W. Lambright, company manager; Max Crawford, manager of Talara operations; Paul R. Ratliff, assistant general manager; Irizarry; and Guillermo Moscoso, manager of public relations.

PERSONALS

Production Head

Roger Sherman has been active in foreign fields

ROGER H. SHERMAN, coordinator of all producing activities for Standard Oil Co. (N.J.) is a veteran of the Venezuelan oil fields.

The 48-year-old official was born in Denver and was graduated from the University of Colorado in 1926 with a B.A. degree in geology. His first assignment was with Huasteca Petroleum Co. in Mexico. Following purchase of that company from Standard Oil Co. of Indiana by Jersey Standard in 1932, he moved down to Venezuela.

From 1933 to 1946, he engaged in more exploration for the old Standard Oil Co. of Venezuela. He headed that firm's exploration division and then served as a director of Creole Petroleum Corp.

Leaving behind a prized orchid garden—a hobby of years in Venezuela—Sherman joined Creole's New York office in 1946 as a vice president and coordinator of operations.

Two years later he was appointed deputy coordinator of producing operations for Jersey Standard and on November 1, 1949, assumed his present position.

Although no longer directly connected with geological work, he maintains a deep interest in this field. He is an active member of the American Association of Petroleum Geologists, the American Institute of Mining and Metallurgical Engineers, and several similar organizations.

Watching the Dodgers now vies with coin-collecting and gardening as his chief hobby.

Philip H. Jennings, a staff geologist for Magnolia Petroleum Co. in Dallas the past 3 years, has been promoted to assistant chief geologist. He succeeds **John W. Clark,** who has been advanced to chief geologist. **John A. Lester,** seismic supervisor at Dallas, has been promoted to assistant director of geophysical exploration.

B. A. Owen, tool pusher for Delta Drilling Co., has been transferred from Emporium to Driftwood, Pa.

Willis B. Reals, chemical engineer for The Texas Co., has been transferred from the Lawrenceville Works, Lawrenceville, Ill., to the Eagle Point Works at Westville, N. J.

O. F. Sebesta, assistant district superintendent for The Texas Co. at Midland, Tex., has been promoted to West Texas division general superintendent of drilling and production at Fort Worth. He is succeeded at Midland by **H. F. Longren,** formerly district petroleum engineer at Pampa, Tex.

John T. Rouse has been appointed manager of exploration and **James C. Menefee,** chief geophysicist for the newly created exploration and producing organization of Socony-Vacuum Oil Co. in the Williston basin and northern portion of the Rocky Mountain states. Rouse has been a staff geologist in the

JOHN T. ROUSE

J. C. MENEFEE

Dallas general offices of Magnolia Petroleum Co., and Menefee formerly was assistant director of geophysical exploration for Magnolia. They will be located in Casper, Wyo., temporary headquarters of the new unit.

Ray Althouse, executive vice president of Royalite Oil Co., Ltd., Calgary, Alta., has been appointed to the board of directors to fill the vacancy created by the resignation of **K. H. Houston,** vice president and operations manager. Althouse joined Royalite last May. He previously had been executive assistant for Cities Service Oil Co. (Del.) and subsidiaries. Houston and **F. J. Cameron,** manager of Royalite's industrial relations department, have purchased the company's drilling department and have formed a privately owned firm under the name of Petrolia Drilling Co., with headquarters in Calgary.

John J. Frommer, division manager for Ohio Oil Co., has been named chairman of the Louisiana payroll savings committee of the U. S. Treasury Department's savings bonds division.

T. L. Lenzen, manager of Eastern Hemisphere operations for Standard Oil Co. of California, has been elected a vice president. Lenzen, who joined the company in 1928, has been closely affiliated with Middle East oil development since 1938. He also is a director of Bahrein Petroleum Co., Ltd., California Texas Oil Co., Ltd., and Overseas Tankship Corp.

E. J. Theessen, division paleontologist for Shell Oil Co. at Corpus Christi, has been promoted to division stratigrapher. He has been with Shell since 1936.

George B. Pichel, geologist for Union Oil Co. of California, has been transferred from Houston to New Orleans.

Kenneth A. Stierman, junior engineer for Standard Oil Co. of Ohio at St. Louis, has been promoted to engineer.

J. K. Wright has resigned as petroleum engineer for the Mississippi Oil and Gas Board to open consulting offices at Jackson, Miss.

K. E. Adams, senior geologist for The Texas Co. at Tulsa, has been promoted to assistant division geologist. He joined the company in 1933 and has served in Michigan and Kansas.

N. Ted Johnson, tool pusher for Circle Drilling Co., Inc., has been transferred from De Quincy, La., to West Baton Rouge.

Kenneth E. Lundquist has been promoted to engineer in the operating section in the St. Louis office of Standard Oil Co. of Ohio. He has been on temporary assignment in the company's home office operations section in Cleveland since last January.

PERSONALS

Attend Reservoir-Engineering School

These men are taking part in an advanced reservoir-engineering course conducted at Tulsa for engineers in the Standard Oil Co. (N.J.) organizations. The school, which is being attended by engineers from seven foreign countries, began October 6 and will close November 14. Front row, left to right, are: J. N. Sicking, Carter Oil Co., one of the instructors; A. H. R. Grimsey, Iraq Petroleum Co., Ltd.; Herman Quaadgras, Standard Vacuum Oil Co.; Philson D. Collins, Arabian American Oil Co.; Willis J. Gibson, Imperial Oil, Ltd.; Eduardo Pflucker, International Petroleum Co. (Peru); Hugo A. Carrillo, International (Peru), and Donald L. Sowers, Carter. Middle row: Scott Ewing, Jr., Carter; Harold Hansen, International Petroleum Co. (Colombia); W. Harold Longworthy, International (Peru); John F. Armstrong, Carter; Vernon C. Larson, Imperial; John H. Nicholls, Imperial; John A. van Leeuwen, Standard-Vacuum Oil Co.; William L. Robbins, Carter; Julius Abzinger, Imperial; Fred A. Hilton, Arabian American; K. H. Larsen, Carter; and Philip H. Lipstate, International Petroleum (Colombia). Top row: Whit Y. Mauzy, Jr., Creole Petroleum Corp.; Gene R. Blendermann, Creole; Jack Jones, Creole; Antonio Terrenzio, Creole; M. R. Soto, Creole; Roger N. Gregston, Creole; J. K. Lytle, Carter; J. L. Wible, Carter; M. K. M. Kelly, Arabian American, and Edward R. Cutlan, Imperial.

Frederick F. Dueser, formerly an engineer for Republic Natural Gas Co. at Corpus Christi, has been appointed an engineer for Amstutz & Yates, Inc., at Wichita.

Bruce Jones has resigned as chief project engineer in the fats and oil section of Girdler Corp. at Louisville, Ky., to become refining research director for Panhandle Oil Corp. He will maintain headquarters in Wichita Falls, Tex. Before joining Girdler he was an engineer for The Texas Co. in its refining departments at Port Arthur, Tex., and New York.

J. E. Klipp has been transferred by Sunray Oil Corp. from Los Angeles to the Newhall, Calif., field offices as production engineer. He succeeds **J. R. Lynch,** who has resigned.

Robert L. Milligan, executive vice president of Pure Oil Co., has been elected a director. He joined the firm in February 1929.

Albert Gregersen has been named executive assistant area manager of the foreign production division of Gulf Oil Corp. in New York. He will continue to act as that department's governmental relations adviser. Other foreign production appointments include: **E. E. Ferrin,** technical adviser; **C. W. Flagler,** exploration adviser; **L. C. Sass,** assistant exploration adviser, and **Wolfe J. Frankl,** economic adviser.

J. J. Dorgan, Jr., who has been associated with Continental Oil Co.'s coordinating and planning department since 1948, has been promoted to assistant to the president.

Bob McCain, geologist for Frontier Refining Co., has been transferred from Farmington, N. M., to Denver. He has been succeeded at Farmington by **Jack Boyd.**

Don R. Holbert, junior production engineer for Carter Oil Co., has been transferred from Purcell, Okla., to Cut Bank, Mont.

T. E. Young has been transferred by Shell Oil Co. from Colorado exploration to the Williston basin district at Tulsa. Other company changes include: **J. D. Sweet,** transferred from Great Bend, Kans., to Illinois and promoted to division reservoir engineer, and **C. L. Creager,** transferred from Great Bend to Tulsa as area exploitation engineer.

J. A. Bierbaum, chemical engineer for Standard Oil Co. (Ind.), has been transferred from the research department at Whiting, Ind., to the production department at Chicago.

William R. Franey, field engineer for Stanolind Oil & Gas Co., has been transferred from Ellinwood, Kans., to Duncan, Okla.

K. E. Thornton, district superintendent for Sinclair Oil & Gas Co., at Drumright, Okla., has been promoted to assistant division superintendent at Casper, Wyo. Other company changes involve: **Leo J. Endres,** district foreman at Flagstaff, Ariz., transferred to Roosevelt, Utah, and **William M. Cain,** assistant district foreman at Delaware, Okla., transferred to Carmi, Ill.

R. N. Wert, district production superintendent for Pure Oil Co., has been transferred from Breckenridge to Mount Pleasant, Mich.

Lester M. Goldsmith, general manager of the engineering and construction department of Atlantic Refining Co., has been granted a life membership in the American Society of Mechanical Engineers. Goldsmith, who

PERSONALS

was elected a fellow of the society in 1917, received a gold-embossed life membership and certificate.

W. Wayne Albright, assistant manager of the lubricating and sales technical service department of Standard Oil Co. (Ind.), Chicago, has been elected president of the National Lubricating Grease Institute.

J. R. Clarke, production foreman for Gulf Oil Corp., has been appointed production foreman for Gulf Refining Co. in its eastern division at Kawkawlin, Mich.

F. G. Brown, tool pusher for B. L. McFarland, Inc., has been transferred from Midland to Colorado City, Tex.

Dr. Eger V. Murphree, president of Standard Oil Development Co., central research and engineering affiliate of Standard Oil Co. (N. J.), has been named as the 1953 recipient of the Industrial Research Institute medal.

Edwin G. Schempf, formerly executive vice president and director of United Geophysical Co., Pasadena, Calif., has been elected president of Precision Exploration Co., Tulsa. **K. A. Robertson** has been elected executive vice president and treasurer of the company. Robertson formerly was chief geophysicist for Union Oil Co. of Canada before leaving in 1951 to start Precision Exploration Co.

Robert B. Galeski, Honolulu Oil Corp., Bakersfield, Calif., has been elected president of the Pacific section of the Society of Exploration Geophysicists. Officers of the Pacific sections of the S.E.G., the Society of Economic Paleontologists and Mineralogists, and the American Association of Petroleum Geologists were chosen at a joint meeting of the three groups in Los Angeles last week. Other S.E.G. officers are: **Carl Savit,** Western Geophysical Co., Los Angeles, vice president, southern district; **William D. Cortright,** Tide Water Associated Oil Co., Bakersfield, vice president, northern district, and **Robert J. Wells,** Richfield Oil Corp., Bakersfield, secretary-treasurer. S.E.P.M. officers elected were **Orville L. Bandy,** University of Southern California geological department, president, and **Dana Braislin, Jr.,** Union Oil Co., Compton, secretary-treasurer. For officers of the A.A.P.G. see page 75.

George K. Knight, director and plant superintendent for Consumers Gas Co., has been named assistant general manager.

Ralph Deeds, assistant general foreman of the refining division of Esso Standard Oil Co. at its Baton Rouge, La., refinery, has been appointed assistant manager of the International Petroleum Co. refinery at Barrancabermeja, Colombia.

C. H. Daugherty, superintendent of the mechanical division in the Whiting, Ind., refinery of Standard Oil Co. (Ind.) has been named assistant general superintendent. Daugherty, who joined Standard as a foreman in 1916, has served as assistant master mechanic and as assistant superintendent of the mechanical division.

C. B. Wentz has been promoted to the newly created position of manager of the coordinating and planning department of Continental Oil Co. He will continue to make his headquarters in Houston, where he has been serving as chief proration engineer since 1950. He has been succeeded by **P. N. Collis-ton,** formerly proration engineer for southern and southwestern regions.

H. W. Nippert, district petroleum engineer for The Texas Co. at Pampa, has been appointed district petroleum engineer at Midland. He succeeds **H. F. Longren,** who has been advanced to district superintendent at Midland. **J. G. Glenny,** petroleum engineer at Wichita Falls, has been named to succeed Nippert. **R. G. Wilson,** petroleum engineer in the Snyder area, has been promoted to field foreman at Snyder. Wilson replaces **Tommie Bliss,** who has been transferred to Glendive, Mont., as a drilling foreman.

H. O. Woodbury has been appointed district exploration superintendent for The California Co. at Casper. He replaces **J. F. Partridge** who has resigned.

F. Roe Weise has been appointed associate director of industrial relations for Standard Oil Co. (Ind.), a new position. **E. W. Ahern** and **J. P. Nielsen** have been appointed assistant directors of industrial relations for the company.

Don Benson, division geologist for Forest Oil Corp., at Denver, has resigned to become chief geologist for Colorado Oil & Gas Co., Denver. The latter firm, a subsidiary of Colorado Interstate Gas Co., will do exploration work in the Rocky Mountain and other areas.

Donald F. Todd, formerly geologist for Stanolind Oil & Gas Co. at Billings, and **Charles Hauptman,** formerly geologist for the U. S. Geological Survey, at Salt Lake City, have formed a geological consulting firm, Hauptman-Todd, Associates, at Billings.

DEATHS

J. R. (Dick) McCarthy, 40, a field representative for Oilwell Supply Co. in Michigan the past 14 years, died October 26 at Dearborn, Mich.

Raymond O. Vincent, 62, Okmulgee, Okla., oil broker and producer, died November 3. He came to Okmulgee in 1913 from Mount Vernon, Ind.

S. B. Burney, 79, Vivian, La., pioneer driller, died in a Shreveport hospital October 31.

Lt. Stuart Monroe Blazer, 25, Ashland, Ky., younger son of Paul G. Blazer, chairman of the board of Ashland Oil & Refining Co., was killed in action October 14 in Korea. He worked a year with a seismograph crew for Amerada Petroleum Corp. and spent summer vacations as an employe in the Mid-Continent Petroleum Corp. refinery at Tulsa and in pipe-line operations in eastern Kentucky fields for Ashland.

Frank A. Terry, 46, land man for Tide Water Associated Oil Co., died October 28 at Midland, Tex.

A. B. Cheuvront, 86, Oblong, Ill., independent producer, died October 24 at Robinson, Ill. He was identified with oil development in Illinois, Pennsylvania, central and northwestern Ohio, and Indiana.

Otho E. (Bill) Castleberry, Tulsa, 41, materials manager for Midstates Oil Corp., died October 29 in a Lake Village, Ark., hospital following injuries suffered in an automobile accident.

Octane Trend Continues Upward

No let-up seen for next 3 years; after that there will be smaller annual gains, but the limit isn't yet in sight

George Weber

A GRADUAL upward trend in motor-gasoline octane ratings is strongly indicated for the next few years.

Assuming no important changes in current economic conditions and a continuation of the military defense program as scheduled, it appears to those engaged in studying the octane situation that the rate of improvement of gasoline quality will follow closely the trend of the past several years.

The best educated guesses seem to concur on a premium fuel in the 95-96 research octane range on the East Coast by the end of 1955. This amounts to an annual increase of about one octane number. Ratings of both grades elsewhere in the nation, with the probable exception of the West Coast, are expected to rise at least correspondingly during that period.

In September the weighted-average research ratings of gasoline on the East Coast stood at 92.3 for premium and 87.3 for regular. The weighted national averages for the same month were 91.3 for premium and 84.8 for regular.

It should be pointed out that this forecast of octane increase represents only a consensus of estimates. Future octanes cannot be plotted with any degree of accuracy, being subject to too many imponderable factors. Estimates represent a combined projection of the ability on the part of refiners to make these higher octane grades, and the probable incentives which may press them to do so.

Trend was interrupted . . . It is conceded that the future annual increase in hydrocarbon octanes will show a growing tendency to lessen, since each increment becomes successively more difficult and costly to manufacture. But this levelling-off trend may not be reflected in marketed octanes during the next 3 years, because of two developments of the recent past.

The stockpiling program for tetraethyl lead and, to a lesser extent, the refinery strikes of last spring are generally considered to have halted an otherwise continuous octane climb.

During the temporary reduction in TEL supply, construction of new processing facilities continued uninterrupted. This resulted in an improved hydrocarbon octane potential. Since TEL controls have been taken off, many refiners retain a slightly improved octane cushion which was not absorbed in last summer's octane increases. There was widespread talk last spring of an impending octane "race," but the refinery strikes postponed or at least suppressed it. Thus, although antiknock quality did improve gradually during the summer, it now stands at a level below what would have been expected had these two events not occurred.

It is conceivable that the difference between the average octane which the industry could make today, and the average octane that is being marketed represents a sufficient margin to offset the possible levelling-off trend for the next 2 or 3 years.

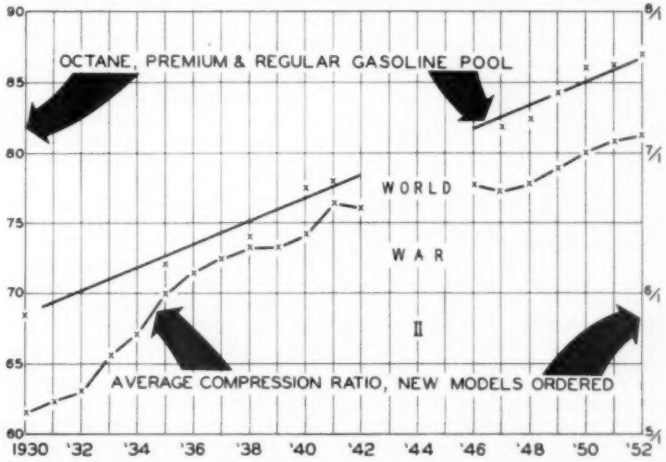
Trend in composition . . . The gradual improvement in hydrocarbon octanes is illustrated by a recent study of gasoline composition. The figures shown below are considered representative of the average pool of gasoline produced in this country in 1951 and the average to be produced in 1953:

Components, in vol. per cent—	1951	1953
Light virgin naphtha	25.7	24.8
Heavy virgin naphtha	8.9	7.1
Thermal cracked	15.2	13.8
Polymer	1.2	1.2
Butanes	5.0	5.0
Natural gasoline	8.7	7.7
Catalytic cracked	25.6	28.5
Catalytic reformed	0.4	3.4
Thermal reformed	9.3	8.5

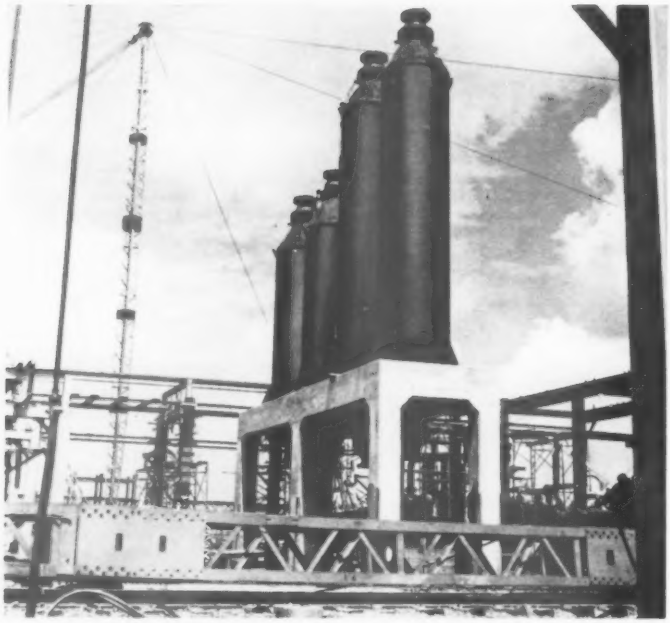
The reduction in virgin naphthas reflects diversion for catalytic reforming charge, and to a slight extent, jet-fuel blending. The figures for polymer are based on feed stocks from thermal cracking and thermal reforming only, with polymer components from catalytic cracking included with catalytic cracked stocks. This 2-year comparison of clear gasoline components represents an annual gain on the order of one hydrocarbon octane number.

While past records of gasoline octane improvements are alone not valid in predicting future trends, they indicate the marked progress of the industry based on factors which may be expected to continue effective in varying degrees. The accompanying chart plots the upward trend in antiknock quality of the weighted average of both premium and regular grades, expressed in research octane numbers. For those

Upward Trend in Antiknock Quality of All Gasoline



THE TREND in average compression ratios of new-model passenger cars, and the weighted research octane rating of the total gasoline pool. (Octane values from E. I. du Pont de Nemours & Co., Inc.).



CATALYTIC REFORMING UNITS like this 16,000-bbl. Platformer constitute the most important factor in the rising-octane trend. This unit is nearing completion at Shell Oil Co.'s Houston refinery.

years predating the use of the research or F-1 method, the values are calculated on the basis of best available information regarding gasoline composition.

The octane potential . . . The ability of the industry to add to gasoline octanes on an economic basis can be assessed by projecting future processing programs.

Since at least a year must elapse before announced construction projects go on stream, the potential can be plotted with fair accuracy a year or two in advance. In so doing, it is necessary to generalize in estimating what refiners will do with their facilities at hand.

Without attempting to weigh the complex factors of varying conversion levels and product balance, estimators must be content to assume that new facilities will be operated at a continuing "normal" level.

Catalytic cracking . . . During the past several years, catalytic cracking has been the dominant factor affecting octane ratings of gasoline. Continued expansion of this process will remain an important factor regarding octane, but as the quality level rises each added barrel of catalytic cracking capacity will show a lessening effect in raising total product octane.

Expansion of catalytic cracking facilities is not predicted alone on the need for higher octanes. The process improves both yield and quality of light and middle distillates and permits a reduction in lower-value residual products. Therefore, the ratio of catalytic cracking capacity to crude capacity may be expected to increase for many years to come, as catalytic conversion gradually replaces thermal cracking of distillate stocks, and as deeper cuts are made in heavy crude fractions to obtain clean catalytic cracking feed stocks.

In 1946 catalytic cracking capacity in this country represented about 17 per cent of crude charging capacity. This factor has risen consistently. By 1949 it reached about 22.5 per cent; by 1950, 24.4 per cent; by 1951, 26.7 per cent and early this year it stood at 31.3 per cent.

According to the Petroleum Administration for Defense, necessity certificates had been approved by last April for new catalytic cracking and crude capacity to raise the ratio to about 36.6 per cent. This latter factor is not a firm one and cannot yet be fixed in the future, because of the varying schedules for the construction projects involved. Some may not be realized and on the other hand, others are coming along which were not represented in that total. It may be assumed that this new level will be reached during 1954.

This projected balance on catalytic cracking shows that refiners of medium size will catch up with the majors in their catalytic cracking balance. Should all of the approved projects be built, companies controlling over 50,000 bbl. per day of crude capacity would reach a level of 38.3 per cent in catalytic cracking capacity relative to crude capacity. Companies controlling from 20,000 to 50,000 bbl. per day of basic capacity would reach the 38.7 per cent level. Refiners with less than 20,000 bbl. per day in capacity will continue to lag, with their level at 24.1 per cent. Since this category includes scores of small skimming plants without modern facilities, it represents a considerable gain for certain other refiners who are modernizing their facilities.

A recent study of gasoline quality indicates that smaller refiners have already caught up with the majors. Two years ago, major refiners used about 0.12 cc. less TEL per gallon than did the remainder of the industry. They led by an average of 0.6 research octane numbers in their clear pool, and by 0.3 number in the weighted average of all gasoline marketed.

Last month a comparable study showed that the weighted average for all gasoline at major oil company stations was slightly less than the national average, and that TEL content was exactly the same. Although subject to the errors induced by sampling, this study tends to show that independent refiners are catching up in catalytic cracking and have realized some advantages from the early lead they have taken in adopting catalytic reforming.

Studies of projected catalytic cracking unit construction indicate that expansion of this process alone may add 1½ to 2 potential octane numbers to the clear pool of all motor gasoline over the next 3 years. Because of the added effect of catalytic desulfurization in improving TEL response, the improvement in leaded gasoline should amount to 2 or 2½ research numbers. Beyond 1955 no firm projection is possible, but the increments are expected to become smaller.

The effect of adding octanes by expanding polymerization capacity are included in the above estimates, since light ends recovery and polymerization facilities are generally integrated with new catalytic cracking units.

Catalytic reforming . . . During the next few years, the big boost to be given gasoline octanes will come from catalytic reforming. By converting heavy virgin naphtha and some light naphtha from the lowest octane com-

ponents to the highest in the gasoline pool, this process shows a potential for raising the clear gasoline pool octane as much as 6 or 7 research numbers if given maximum application.

A study of a group of typical refineries further illustrates what might be expected from catalytic and thermal reforming. In the particular case study, the total gasoline pool with no provisions for reforming of virgin naphthas, shows a research octane rating of 87 numbers with 3 cc. of TEL per gallon. Thermal reforming on the basis of 10 per cent of crude capacity will result in raising the octane to 91 with the same lead dosage. Catalytic reforming on a comparable scale will alone raise the octane to 92½. Combined thermal and catalytic reforming for a total throughput of 20 per cent on crude would give a 95 octane gasoline pool.

This example checks with other typical studies and indicates that for normal levels of conversion, catalytic reforming as compared with thermal reforming will give about one number better on clear pool octane and about 1½ more numbers on leaded gasoline. From the standpoint of yields the catalytic process is clearly superior, and its advantage increases with the level of conversion.

These figures appear unduly conservative in the light of results from many catalytic reformers which have been placed in operation during the past 2 years. This is due to the fact that the estimates above are based on average cases, where the total gasoline pool comprises substantial fractions of catalytic and thermal cracked stocks and relatively small proportions of straight-run naphthas. It follows that most of the first catalytic reforming units were built in refineries which needed them most, and could thereby realize the greatest benefits from them. This accounts for the spectacular improvements in some refiners' total product, where large fractions of extremely low octane naphthas were converted to high octane blends.

The benefits to be gained from catalytic reforming are now becoming evident on a national scale, but the full effect of this technique will require several years of new construction. Present operating capacity is but a small percentage of crude capacity. The next 2 years will see a beginning of the catalytic reforming expansion program, which is expected ultimately to process nearly all of the reformable straightrun fractions which are available for blending to gasoline.

Altogether, catalytic reforming units now in operation, under construction, and firmly committed aggregate about 286,000 bbl. per day in total charge capacity. By the time the last of these units is placed on stream, some 2 years hence, catalytic reforming will approach 3.5 per cent of total crude capacity. This projected capacity, used for normal operations, will increase the potential octane of the national gasoline pool about 2 research numbers.

Some of these units will be operated to produce aromatics, and some will fractionate out a portion of the reformate for high-octane aviation-gasoline blends. Even in such cases the volumes diverted to other uses represents roughly 25 per cent or less of total charge, leaving a substantial fraction of remaining reformate available for motor-fuel blending. The proportion to be withdrawn from gasoline blending will depend on many factors, including the aromatics market and the success of the aviation gasoline program.

Jet fuels . . . With a current demand on the order of about 100,000 bbl. per day, the jet-fuel program represents a very small factor in the total petroleum market. Government estimates indicate, however, that demand will rise substantially during the next few years.

This anticipated jet-fuel consumption will show an increasing effect in raising the octane of motor gasoline, simply by withdrawal of the lowest octane fractions. On the average, the diversion of the 7 per cent fraction of heavy naphtha in the present gasoline pool would result in a clear octane improvement of four numbers in the remaining blend.

Without a clear program from the military on future requirements, the jet-fuel factor cannot accurately be evaluated at present. It will presumably have little effect on the quality level of all gasoline produced by 1955. But its potential effect in the extended future may be substantial. It will compete for catalytic reforming feed stocks and may influence some refiners to go into jet-fuel blending and realize what they can in octane improvement of their remaining gasoline product by subtraction of the poorer quality blend stocks.

Lead situation . . . Tetraethyl lead is presently in adequate supply and is expected to remain so. The price has been kept relatively low with comparison with the cost of new facilities for improving hydrocarbon octanes. Thus many refiners are finding it economical to rely more on TEL for their needed octanes, and less on severe processing.

The trend in lead dosage has been gradually upward in the past and may be expected to increase still further. If, as expected, the cost of increasing octane with TEL remains lower than adding hydrocarbon octanes by plant expansion, refiners may be expected to maintain a fairly high lead content on their gasoline, up to a point.

As the remaining margin to the 3 cc. limit shrinks refiners, are impelled to improve processing facilities in order to continue to operate with a fair cushion on TEL octane. The amount of that margin depends on individual plant economics involving new unit costs, conversion levels, and the price of TEL.

Summarizing, the projected construction of catalytic cracking and reforming units and the small but growing importance of jet-fuel demand combine to indicate that 3 years hence the American refiner will be in a position to produce gasoline about 5 research octane numbers higher than the present. This is borne out by reported plans of some refiners calling for the ability to market 97-octane premium on the East Coast before 1956.

Incentive factors . . . How high octanes will actually go by the end of 1955 depends on a number of other factors. Here is where the estimators begin to rely more and more on educated guesses.

It is generally conceded that brisk competition in the oil industry is responsible for most of the progress shown in quality improvement. Octane "races" most often result when gasoline is long on supply.

The prospect for the next few years appears to be one of plentiful gasoline stocks. Economists predicate this forecast on the growing demand for heating oils which tend to maintain crude runs at a high year-round average, an adequate crude supply, and a continuation of refinery expansion.

Automotive factor . . . Assuming that the market factors will provide a climate favorable to octane competition, a further incentive for boosting quality will be provided from the automotive industry.

Those passenger-car manufacturers which are most aggressive in pushing compression ratios attempt to take full advantage of the existing gasoline octanes when designing new models each year. In so doing, they introduce new engines which push the limit on octane. Inevitably, some cars will begin to knock on the grade of fuel for which they were designed.

This sustained pressure in the form of complaints to oil companies serves as a direct cause for some octane increases. While the percentage of such "critical" cars on the highways may be negligible, their influence on moving

Trends of U. S. Passenger-Car Design Since 1925

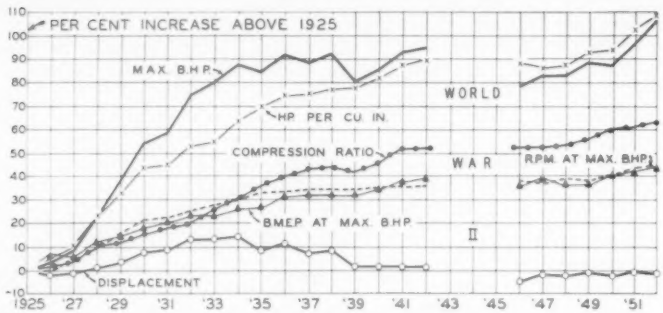


CHART SHOWS averages of values listed in trade publications. (Chart courtesy Ethyl Corp.).

the octane level upward is inordinately high. This factor is difficult to measure, but it may roughly be anticipated by noting the compression ratios of new cars as they are introduced each year.

While it is still too early to determine what the specific octane requirements of the forthcoming 1953 models will be, it is understood in automotive circles that compression ratios are going up again, on the average. Few specific figures have been given out to date, but according to the grapevine some fairly sizable increases are coming.

... The new Buick will have a newly designed V-8 engine powering the Super and the Roadmaster, and compression ratios on those two models are rumored to be 8:1 and 8.5:1 respectively. How much increase in octane requirement is represented by this jump from 6.9:1 and 7.5:1, respectively, cannot be determined since the new engine is of a completely different design and will incorporate some changes to improve so-called "motor octane."

... Oldsmobile and Cadillac are believed to be increasing their compression ratios also, from the present 7.5:1 to 8:1 or higher. General Motors Corp. will quote no figure at this time. Representatives verify, however, that compression ratios are going up in the Cadillac, Oldsmobile, and Buick, and to a lesser extent in the Pontiac, but they are quick to add that they have also made improvements to increase their octane appreciation.

... The new Chrysler will remain the same on ratio, and the new Dodge will increase slightly. Lincoln is said to be going from 7:1 to 8:1.

Although unverified, these rumors combine to indicate that pressure will continue strong next year for further octane increases. The average compression ratio for new models offered will reach a new high above the 7.12:1 average shown for 1952. Maximum brake horsepower and horsepower per cubic inch of displacement as shown in the diagram above will also increase in 1953.

No octane controls planned . . . The defense effort is not expected to suppress octanes in motor fuel, at least for the coming year.

Some refiners with catalytic reformers will be called on for aviation gasoline blend stocks. But many new reformers are not equipped with the fractionation facilities to make these cuts, and even where they may be withdrawn from gasoline blends, they do not represent large fractions of total reformate.

According to the Petroleum Administration for Defense, the aviation-gasoline program is on a hand-to-mouth basis, and adequate supplies for the future are not yet in sight. The upward octane moves are cutting somewhat into the supply of lower aviation-gasoline grades.

Alkylate, which is now going wholly to avgas, will not be available for motor gasoline in the foreseeable future. If and when it does become available, it will contribute but little to octane. It is estimated that if all available butanes-butylenes were today being alkylated for blending to motor gasoline, the net increase of the total gasoline pool would amount to only 1 or 1½ octane numbers.

How high can they go? . . . In looking at the extended future, it appears that with enormous expenditure in new processing facilities, the industry might extend present known techniques to produce a premium gasoline in the 100-octane range.

The next step after catalytic reforming is a matter of conjecture at present. Much research effort is being directed to the catalytic conversion of the residual crude fraction. By means of vacuum distillation and solvent extraction, added clean fractions are being separated from this heavy fraction for clean catalytic cracking stocks.

The light ends are regarded by some as showing promise of contributing further octane increments—at a price. Diisopropyl or 2,3-dimethylbutane is cited as an example. This is obtained by alkylating isobutane with ethylene. Like other alkylates, it has excellent clean-burning characteristics and possesses a high octane blending value.

Fairly substantial fractions of ethylene are understood to be present in some natural gas which is going into pipe lines. Should future returns justify, it is considered likely that this olefin fraction could be economically extracted and converted to high octane blend stocks.

When considering the possibilities of pushing motor octanes toward the 100 mark, refiners are faced with a marked departure from the yield factors which have been effective to the present. Catalytic cracking combined both higher quality and higher gasoline yields from a barrel of crude. Catalytic reforming will raise the octanes, but at the expense of smaller product yield.

Thus, as the latter comes into greater use, the net yield of gasoline per barrel of crude will at some point level off and trend downward. On this basis alone, some point will be reached where the added power to be gained in a higher compression engine will not compensate for the lower ability of the fuel to power it. At this point other things being equal, the motorist will realize fewer miles per barrel of crude.

Similarly, the mounting costs of producing higher octane fuels must reduce the motorist's miles per dollar, unless the automotive industry devotes added attention to translating higher engine efficiency to the rear wheels.

Octane buildup . . . One problem of engine manufacturers appears to be near solution, as a result of a new development from the oil industry.

Standard Oil Development Co. very recently announced the future availability of a new type of motor oil designed to alleviate deposition in high compression engines. Engine deposition results in a fairly rapid increase in the octane requirement in some cases exceeding 10 research numbers.

If this new development receives widespread application, it will in effect raise the allowable compression ratios of new cars and will permit added efficiency from high-octane fuels. Its net result may be a future increase in compression ratios without the necessity for a comparable rise in fuel octanes.

A Program for 30 million new Americans

LISTEN to the voices of 30 million new Americans. They are answering the pessimists who say we are threatened with depression because we can't keep our farms and factories busy.

Let these pessimists read the future in the census returns. There is a tremendous upsurge in our population. Last year nearly 4 million babies were born. By 1960 we shall total 170 million people--30 million more than when war ended in 1945. This adds to our domestic market more people than there are in Canada and Australia combined.

Providing for these 30 million new Americans can keep our production machinery going at capacity. They call for new hospitals, schools and churches. Larger families need bigger houses to replace post-war houses that are too small now. More and bigger families need improved home equipment and more new automobiles. In short, to maintain and improve living standards for our children, we must work harder than ever before. To supply the needs of our 1960 population, including adequate national defense, it is estimated that the productivity of the individual worker must increase at least 30%, with additional investment of over 200 billion dollars in capital facilities.

There should be no room in this picture for depression. But we must have economy in government, elimination of waste and extravagance and a reduction of taxes and public debt. If we encourage private incentive, thrift and investment, we can bring about the greatest advance in health, wealth and happiness that America has ever known.

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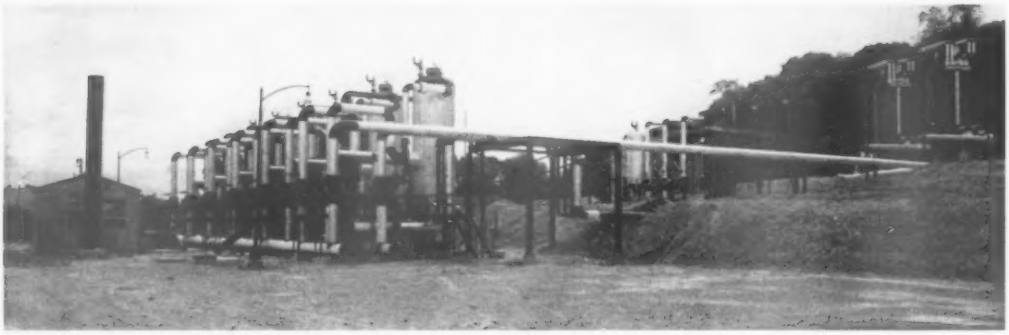


Fig. 1—General view of the Oakford project dehydration plant, looking southwest.

Oakford Project Dehydration Plant Uses Single-Bed Split-Flow Tower Design

Second of Two Articles

Continuous regeneration and robot-controlled valving for automatic operation featured

by Charles R. Hetherington*

THE Oakford storage project of New York State Natural Gas Corp. and Texas Eastern Transmission Corp. involves the handling and storage during summer and redelivery during winter of large volumes of gas at high pressure. The preceding article (October 13 issue of The Journal) generally describes the storage project and the large compressor-station installation required to pump the gas into and out of storage.

In order to prevent hydrate formation of semidry natural gas at the high pressures required for injection into storage and of wet natural gas withdrawn from storage for further transmission, a natural-gas dehydration plant is also provided to remove water both from the gas going to storage and from the gas withdrawn from storage.

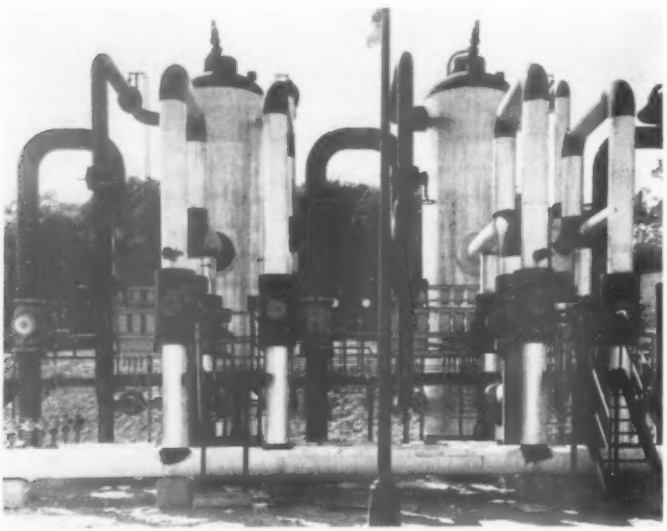


Fig. 3—Dehydration absorption tower and piping arrangement.

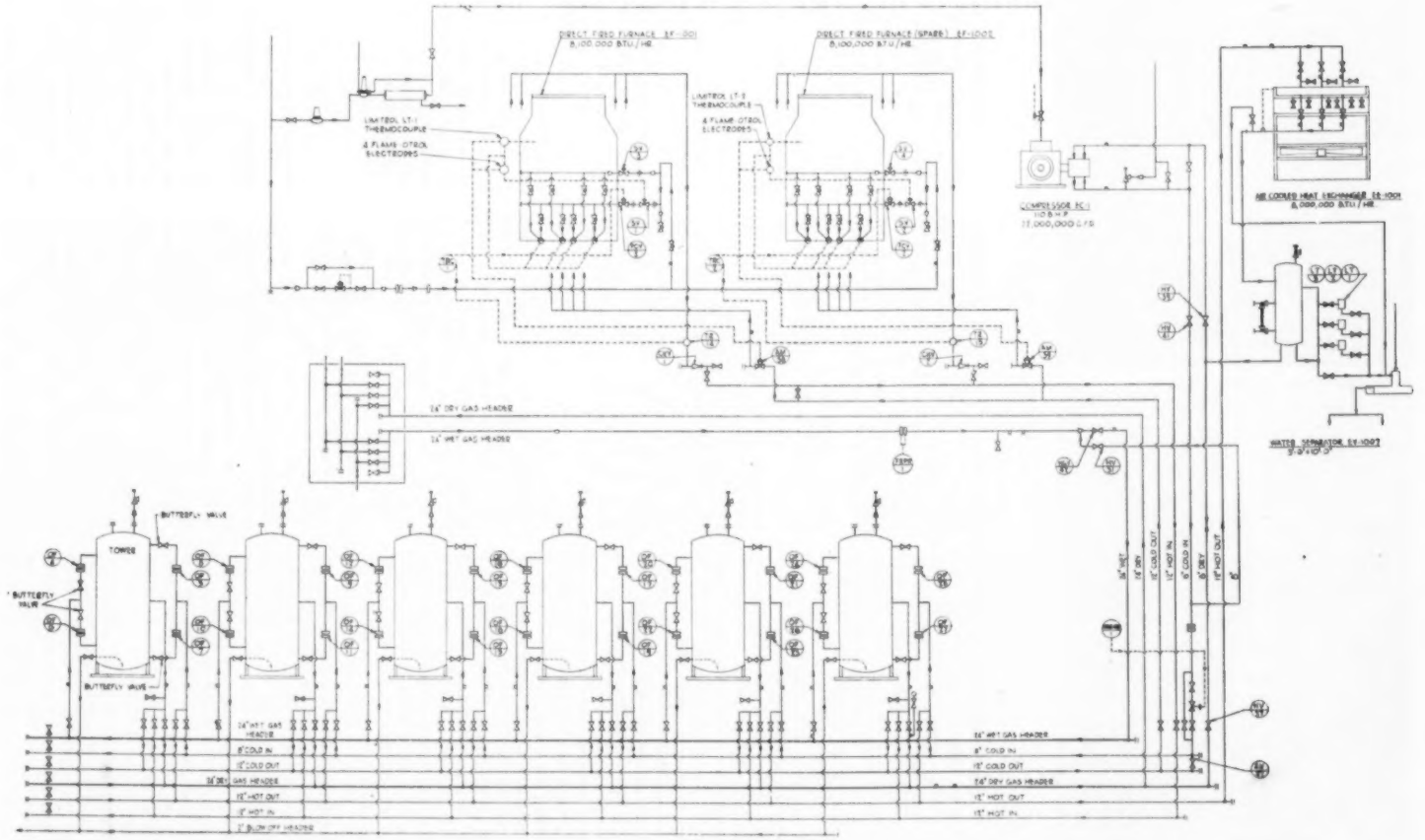
Large volumes up to 400 million cubic feet per day are to be handled and transmitted to the northeastern states where low subsoil temperatures during winter require that the gas be dehydrated to a degree substantially lower than that found suitable for use in the warmer southern states. A study of plant requirements indicated that the dehydration plant should be of the solid-adsorbent type to dry the gas to a dew point of 0° F. at pipe-line pressures.

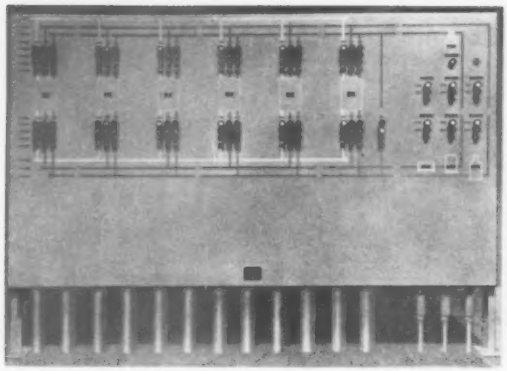
Improved design . . . The improved design developed by Ford, Bacon & Davis, Inc., was selected for this plant. This design, first used in the Austin storage field dehydration plant of Michigan-Wisconsin Pipe Line Co., involves continuous regeneration and robot-controlled electric-motor-driven valving for automatic operation. Of the six towers in the plant only two towers are ever out of drying service for regeneration.

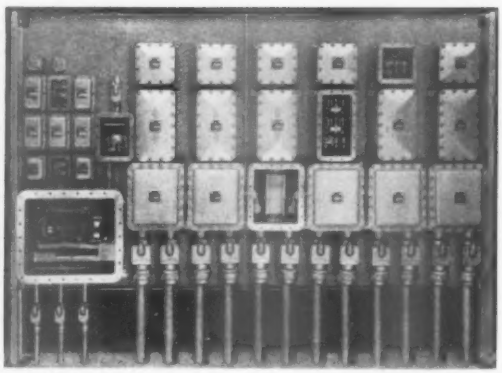
The towers are taken off stream one

*Senior engineer, Ford, Bacon & Davis, Inc.

Fig. 2 Process Flow Diagram of Oakford Storage Dehydration Plant







Figs. 4 and 5—Front and rear views of control panel.

at a time for regeneration permitting continuous operation of regeneration heaters and coolers that need be only about one-half of the size required in the conventional design plant where such equipment operates only one-half of the time. Motor-operated valving necessary in performing the frequent valve changes required by this cycle pays out early in the life of the plant by reducing operating labor.

Split up and down flow through the towers with center outlet is employed to double the flow area and impose balanced forces on the solid adsorbent material, thereby preventing dusting and deterioration of the adsorbent. Only one adsorbent bed with one grating support and filling manhole is required per tower.

Thus this improved design reduces initial cost and essentially eliminates operating labor costs. An indication of the economy of the design is given by the 100 M.M.c.f. per day capacity of each tower of only 78-in. diameter by 30-ft. over-all height including skirt. Fig. 1 shows a general view of the dehydration plant with the towers in the center, the control building at the left, and the cooler and direct-fired furnaces (one spare) to the right.

Manifolding and pressures . . . The dehydration plant is manifolded so that it may be used to treat gas coming from two pipe lines or to treat gas being delivered to the two pipe lines or it may be bypassed entirely as conditions require. During the input period all storage gas will be received at 450 psig., after which it will be compressed to 1,000 to 1,200 psig. for input into storage.

During the withdrawal season gas will be taken at well-head pressure, reduced if necessary to protect plant equipment and delivered into the transmission lines at 850 psig. When the flowing pressure of the storage field is less than 850 psig., the compressor station will be used to boost up to this pressure. Based on economic studies a location for the dehydration plant was selected so that the plant will operate between a minimum of 400 psig. and a maximum of 850 psig.

Design basis . . . The plant is designed to remove water vapor from 400 M.M.c.f. per day of natural gas in one stream to a dew point of 0° F. or less at a pressure range of 400 to 850 psig. Design inlet water content for gas received from transmission lines for storage during the input season is 7 lb. per M.M.c.f. and for gas received from storage during the withdrawal season is 66 lb. per M.M.c.f. Tower sizing is based on a maximum superficial gas velocity during the dehydration period of 35 ft. per minute.

All equipment is designed for a maximum working pressure of 1,000 psig. in accordance with the 1949 A.S.M.E. Code, being the code in force in the State of Pennsylvania.

Because of the frequent heating and cooling in the regeneration cycle all pipe nozzles on the towers are ring-joint A.S.A. Series 900.

The plant is designed to employ S/V Sovabead of 4 to 8 mesh size with 8 per cent by weight design adsorption capacity.

Adsorption towers . . . The process employs six towers each with a capacity to dehydrate at a rate of 100 M.M.c.f. per day for a period of 8 hours. Four towers are in drying service at all times while two towers are off stream for regeneration, one being heated and the other being cooled. Each tower has a split-flow design which divides the wet gas stream into two equal parts, one entering the top of the tower and the other entering the bottom of the tower with both streams leaving the tower at the center.

The towers are 6 ft. 6 in. i.d. by 30 ft. over-all. One grating with screen supports a single bed of solid adsorbent approximately 19 ft. deep. In the center of this adsorbent bed a circular grating with screen is installed to provide annular space for withdrawal of dry gas from the center of the bed. Wet gas enters both the top and bottom of the tower and passes respectively downward and upward through the bed of adsorbent to exit through the annulus and outlet nozzles in the center of the tower.

Forces acting upon the desiccant as a result of the pressure drop due to the flow of the gas are balanced at the center of the bed reducing or eliminating the movement of the desiccant with resulting elimination of breaking up and dusting of the desiccant.

Regular grade Sovabead has a high adsorption capacity at low humidities but breaks up and dusts under impact from liquid water. A second grade of desiccant called Sovabead W which is unaffected by contact with liquid water but which has limited adsorption capacity at the lower humidities is employed at both the top and bottom of a bed to protect the regular Sovabead against contact with liquid water. Each tower contains 4,200 lb. of Sovabead W at the top, 2,800 lb. of Sovabead W at the bottom, and 22,500 lb. of regular Sovabead in the middle of the bed.

Summary of operations . . . Referring to the process flow diagram in Fig. 2 the main stream of wet natural gas is passed through four dehydrating towers operating in parallel. The adsorbent in each tower removes water vapor and any entrained liquid water from the gas until the water content of the adsorbent in any one tower is near design content. In the Ford, Bacon & Davis design each tower at any time has been in drying service a different length of time and as the tower which

has been in service for the longest time reaches design water content the flow of the wet gas to this tower is diverted to a fresh tower and the near-saturated tower is regenerated.

This cycle of operation in which each tower has been in drying service a different period of time is feasible only because of the characteristic of solid adsorbents to give almost constant dew-point gas up to a certain critical water content. Use is made of this characteristic to give constant low-dew-point gas even though individual towers have adsorbed different amounts of water.

Regeneration is accomplished by first passing hot natural gas at about 400° F. through the adsorbent to vaporize and carry away the adsorbed water. The adsorbent is then cooled to below 100° F. by a flow of cool natural gas, whereupon the tower is ready for drying service. Both heating and cooling are done with regeneration gas at the same pressure as the wet gas in the main stream. In order to permit minimum pressure drop through the plant the circulation of regeneration gas is achieved by a small recirculating compressor.

This design eliminates the necessity of taking a large pressure drop in the gas stream being dried in order to obtain the required flow of regeneration gas. Regeneration is continuous, that is, regeneration gas is flowing 100 per cent of the time and accordingly regeneration gas flow of about half of that required in the older type of dehydration plant is adequate. Regeneration heating and cooling equipment may also be about half as large.

Four towers are used to dehydrate the wet natural gas while simultaneously one tower is being heated and one tower is being cooled. Changing of the towers from drying service to heating, from heating to cooling, and from cooling to drying service is accomplished by 37 electric - motor - actuated plug valves controlled by an automatic timer control panel. This control panel is shown in Fig. 2.

Details of Process

Drying gas . . . In the process flow diagram, wet gas enters the plant through the 24-in. wet-gas inlet line, where the pressure and flow rate are recorded through a 30-in. orifice fitting by the flow recorder pressure recorder FR PR-1. The gas then passes through the main gas throttle valve HGV-42 and to the 24-in. wet-gas inlet header.

From this 24-in. header the gas passes through four towers in parallel, entering each tower at the 12-in. nozzles at the top and bottom and leaving at the 18-in. nozzle in the center. The gas then flows to the 24-in. dry-gas header and leaves the plant in the dry-gas exit line.

In order to equalize flow of "wet gas in" to the upper and lower halves of each tower, butterfly valves are provided in the two 12-in. lines which lead respectively into the upper and lower halves of each tower. In like manner butterfly valves are provided in the two 8-in. lines connected respectively to the upper and lower halves of each tower. These 8-in. lines are used alternately for either "cold gas in" or "hot gas out" for each tower.

Orifice fittings, OF-4 to OF-27 are located in the above lines adjacent to the butterfly valves. The flow of gas through these orifices is indicated on flow indicators, FI-1 to FI-6. Two such indicators are provided for every two towers. One is connected in manifold to the orifices in the upper "wet gas in" and the "hot gas out" (or alternately "cold gas in") connection of both towers; the other is connected to the four orifices in the lower tower connections. Flow equalization of any pair of connections is accomplished by manipulating the setting of the butterfly valves until the readings of gas flows on the two flow indicators are the same.

Regeneration . . . During the regeneration operation, each tower and its contents are heated to about 350° F. by a stream of natural gas at about 400° F. from the 12-in. hot gas inlet header. The tower is then cooled to 100° F. or less by a stream of cool gas from the 8-in. cold gas header and then the tower is again ready for dehydration service.

The regeneration gas stream operates as a closed cycle. Starting at the compressor, EC-1, the regeneration gas stream flows in turn through a tower being cooled, one of the direct-fired furnaces EF-1001 or EF-1002, a tower being heated, the air-cooled heat exchanger EE-1001, the water separator EV-1007, and then through the compressor EC-1. Thus the cycle is closed.

In passing through the tower being heated, the temperature of the regeneration gas stream is reduced, furnishing the heat required to vaporize the adsorbed water. The hot gas leaving the tower is cooled to 100° F. or less in the coils of the air-cooled heat exchanger EE-1001. Here most of the water in the gas is condensed and is removed through the water separator EV-1007 and the liquid traps LT-1, LT-2, and LT-3.

The 8-in. hand valve HV-37 is kept open at all times so that the pressure in the regeneration gas stream will be established by that in the main gas stream.

For emergency service during a compressor shutdown the 8-in. valves HV-39 and HV-41 in the compressor connections are closed. The 8-in. valve HV-37 is left open and the 8-in. valve HV-31 is opened admitting gas from the wet-gas header to the inlet of the flow recorder controller-pressure recorder, FRC-PR-1. By throttling the 24-in. valve HGV-42 to cause sufficient pressure drop, gas will flow through the regeneration system from the wet-gas to the dry-gas header.

This emergency gas stream will pass in turn through a tower being cooled, a direct-fired furnace, a tower being heated, the cooling coil in the air-cooled heat exchanger, the water separator, and to the dry-gas header.

The temperature of the regeneration hot gas in the 8-in. lines leaving the tube outlets of the direct fired Iso Flo furnaces is controlled by a thermocouple TR-14 (or TR-15) in these 8-in. hot-gas outlet lines, actuating a temperature recorder-controller TRC-1 (or TRC-2), which regulates the flow of fuel gas to the furnace burners through 2-in. flow-control valves FCV-3 (or FCV-2) in the fuel-gas lines.

When the temperature of the regeneration gas leaving the furnace outlets is above a set maximum, TRC-1 (or TRC-2) actuates a Unilarm which operates a warning signal.

Overheating of an Iso Flo furnace raising the stack temperature above a set maximum on a Pyrometer Limitrol, LT-1 (or LT-2) operated by thermocouples in the top of the furnace shell, will actuate LT-1 (or LT-2) closing 2-in. solenoid valve SV-1 (or SV-2) on the fuel gas lines to the furnaces also closing ½-in. solenoid valve SV-3 (or SV-4) on the pilot burner lines and closing the 12-in. air-motor-operated valve AM-38 (or AM-39) on the 12-in. furnace inlet regeneration gas lines.

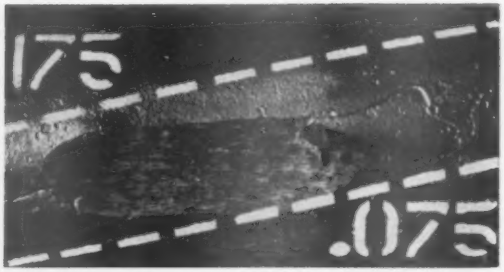
LT-1 (or LT-2) also actuates a Unilarm which operates the warning signal.

Each burner is equipped with a Flame-otrol unit having a flame rod projecting into each pilot burner flame. When any pilot burner flame is extinguished, that Flame-otrol unit flame rod will actuate a Unilarm which sounds a warning signal and closes solenoid valves SV-1, SV-3 and the air-motor-operated valve AM-38 (or SV-2, SV-4 and AM-39) as described under Pyrometer Limitrol control above.

Should a heater tube or connection fail in the Iso Flow furnace a 12-in. check valve, CKV-1 (or CKV-2) in the hot gas outlet line from the furnace will close and stop any backflow of hot regeneration gas into the furnace. Prior to the functioning of these check valves, the excessive stack temperature resulting from the tube failure would

(Continued on page 119)

1. Example of inside seam (often called overlap) defect in drill pipe tested.



2. Outside seam. Upper numerals designate tube number and lower ones indicate defect depth.

3. Outside pits. Deepest pit here is over twice the A.P.I. allowance. This defect did not fail in service.

5. Corrosion fatigue is indicated by the cracks in the two upper bend-test specimens.

4. Failure assumed to be caused by notch fatigue induced or aggravated by slip marks.

Drill-Pipe Rejects Show Good Service Life

Ordinary types of mill defects are demonstrated to be negligible failure factors

by H. G. Texter*

DRILL pipe which is rejected for ordinary mill defects can be used safely in the drill string.

Tests on two strings of mill defects show that ordinary service life can be expected. One string, used by Thompson-Carr, Inc., was in operation for 3,071 rotating hours, drilling in 24 wells for a total footage of 66,634 ft. Drilling location was the Permian basin.

The second string was used by Stanolind Oil & Gas Co. in Andrews and Ector counties, Texas. Used in drilling much harder and lower formations than was the Thompson-Carr string, this string lasted for 25,192 ft. before it was discarded.

Of the total pipe under test in the two strings, only 1.8 per cent failed during drilling operations.

Defects in these strings were greater than those used in the previous test.

*Chief field engineer, Spang-Chalfant Division, National Supply Co., Tulsa.

6. A washed-out crack failure caused by corrosion fatigue. An internal seam defect had no connection with the failure. Arrows indicate additional cracks. 7. (Right) First failure definitely originating in a mill defect. Tube contained an extremely scabby internal seam running its full length.

9. Defect here was a short inside seam, but the failure occurred 2 ft. away in a crack originating on the outside.

10. This tube burst at an inside seam under 2,000-psi. mud pressure while trying to burst a circulating sub.

8. Transverse crack failure, apparently the result of pure fatigue, has its center 180° from the tube defect, a bad inside seam. The defect, therefore, did not cause the failure.

Many of them were so bad the plant superintendent almost refused to let them be shipped.

Tubing specs . . . Tubing used was 4½-in. o.d. by 16.60-lb., Range 2, mixed grades D and E, just as they were discarded by the mill inspectors. Each length was tested to 5,000-psi. internal water pressure, the only procedure differing from the treatment of regular drill-pipe tool-joint product.

Before shipment, a great many photographs were taken of so-called typical injurious defects. Good photographs of inside defects are hard to obtain, so none were made of lengths used in the test. For illustration, however, several tubes were cut open to photograph typical cases of bad inside seams (often called overlaps), as shown in Fig. 1. Many of those actually run were even worse.

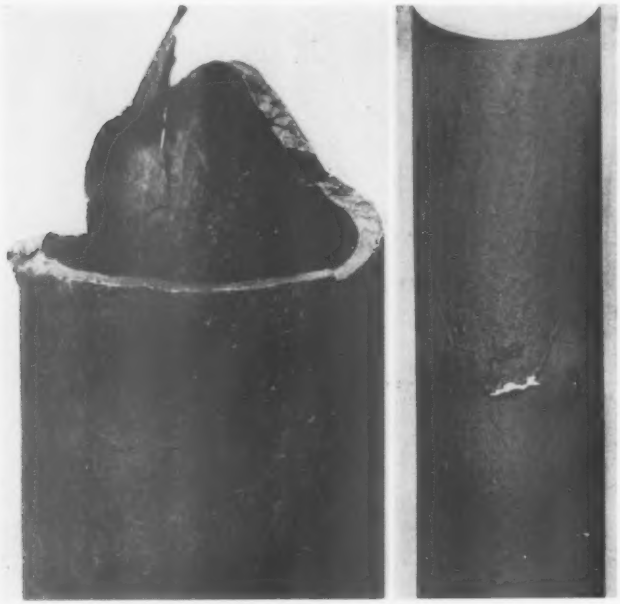
Fig. 2 is illustrative of outside seams in some of the lengths shipped. The upper painted numerals are the tube numbers and the lower ones denote the defect depth. The seams were ground to find their true depth. A.P.I drill pipe is discarded if the depth is more than 0.042 in. (12½ per cent of 0.337 in., nominal wall thickness of 4½-in., 16.60-lb. drill pipe). Typical outside pits are shown in Fig. 3. In tube No. 176 the depth of the deepest pit is over twice the A.P.I. allowable. That in tube No. 174 was almost three times the allowable. Neither 174 nor 176 failed in service.

Preparatory steps . . . In an effort to disprove that rate of failure has any tendency to nullify the effect of mill defects preparatory steps taken were: (1) shot peening and plastic coating most of the length, and (2) using adequate drill-collar weight during drilling to keep the pipe in tension. Furthermore, these steps reduced the very real financial hazard incurred in operating drill-pipe strings, every length of which contained defects that no mill or outside inspector would ever consider passing.

Every length was properly identified and its defects located and cataloged before drilling started.

Thompson-Carr String

The lot of mill rejects destined for Thompson-Carr consisted of 84 lengths



11. A deep intermittent inside seam the entire length of tube did not cause this failure. It started in transverse scars shown in the foreground. 12. (Right) Although there is a sliver near the crack and some roughness beneath it, evidence shows this failure may have started from an external crack caused by spider-slip marks.

(2,500 ft.). By chance, 54 happened to be Grade D and 30 Grade E. To study the relative resistance to corrosion fatigue, 41 lengths were internally shot-blasted and shot-peened, and 43 were shot-blasted and coated with a phenol-formaldehyde thermal-setting plastic. The string drilled in 24 wells, a total footage of 66,634 with total rotating hours of 3,071. All of this was in the Permian basin of Texas and New Mexico, where corrosion fatigue is very prevalent.

The holes drilled were the "salt string" holes, mostly 11 and 12¼ in. for setting 8⅝ and 9⅝-in. o.d. casing. They ranged from 519 to 3,860 ft. deep, the deeper wells requiring additional lengths of nondefective drill pipe. During this period 14 failures occurred, either washed out cracks or complete failures, 8 of which were returned to the mill for study. Of the total, 11 were in Grade D pipe and 3 in Grade E, which may or may not be of significance.

Only 2 failures (not corrosion fatigue) were in plastic-coated pipe, and 12 were in shot-blasted and shot-peened pipe. This also may be significant since only one corrosion fatigue failure occurred in uncoated pipe. Six of the failed lengths were apparently cut up or otherwise discarded before they could be analyzed.

First failure . . . The first failure in the Thompson-Carr string occurred at 20,570 ft. of hole (1,169 rotating hours), the second occurred about the same time, and the third at 31,200 ft. All three occurred about 2½ ft. from the box, which puts them in the slip area. Since it was known that mill defects were not at fault, and since there was no evidence of corrosion fatigue, it may be inferred that the failures were due to notch fatigue induced, or aggravated, by slip marks. Fig. 4, a view of the first failure, is illustrative of the first three.

The test for corrosion fatigue, incidentally, is to cut strips from the pipe, Fig. 5, and bend them backward in a vise so that the elongated inside surface may be examined. If unattacked the surface will be unbroken, as in the lower three specimens. Even a slight amount of corrosion fatigue causes from a few to very numerous transverse cracks, as in the upper two backward bend tests.

Fig. 6 is a typical example of a failure, a washed-out crack, due specifically to corrosion fatigue. This was tube No. 251, Grade E, which failed after drilling 51,360 ft. of hole (2,431 rotating hours). Its mill defects was an internal seam running from the box end upset for a distance of 12 ft. The failure occurred at 16 ft. 8 in. from the box and therefore had not connection with the defect. The tube had been shot-blasted and shot-peened, but was **not** internally coated. Arrows in the photograph indicate additional cracks on the inside surface.

Defect failure . . . Fig. 7 is a photograph of the first failure which definitely originated in a mill defect. This was tube No. 209, Grade D, shot-blasted and shot-peened only, in which there was a very bad internal seam running the full length. It is an example of one of the tubes which was shipped **only** because it was wanted to include a defect that would very likely cause failure.

This seam was of the very scabby type, the thin edge of which curled up into the inside of a tube to such an extent that it would not have passed a drift plug.

Apparently corrosion of the very thin outer edge, sticking up into the mud flow, had induced transverse cracks which, in two places, progressed through the wall of the pipe and were then washed into rounded holes by escaping mud. This, then, is a type of mill defect that very definitely can result in field failure, at least in corrosive mud areas. It is the writer's opinion that the defect would not have resulted in failure in noncorrosive territory.

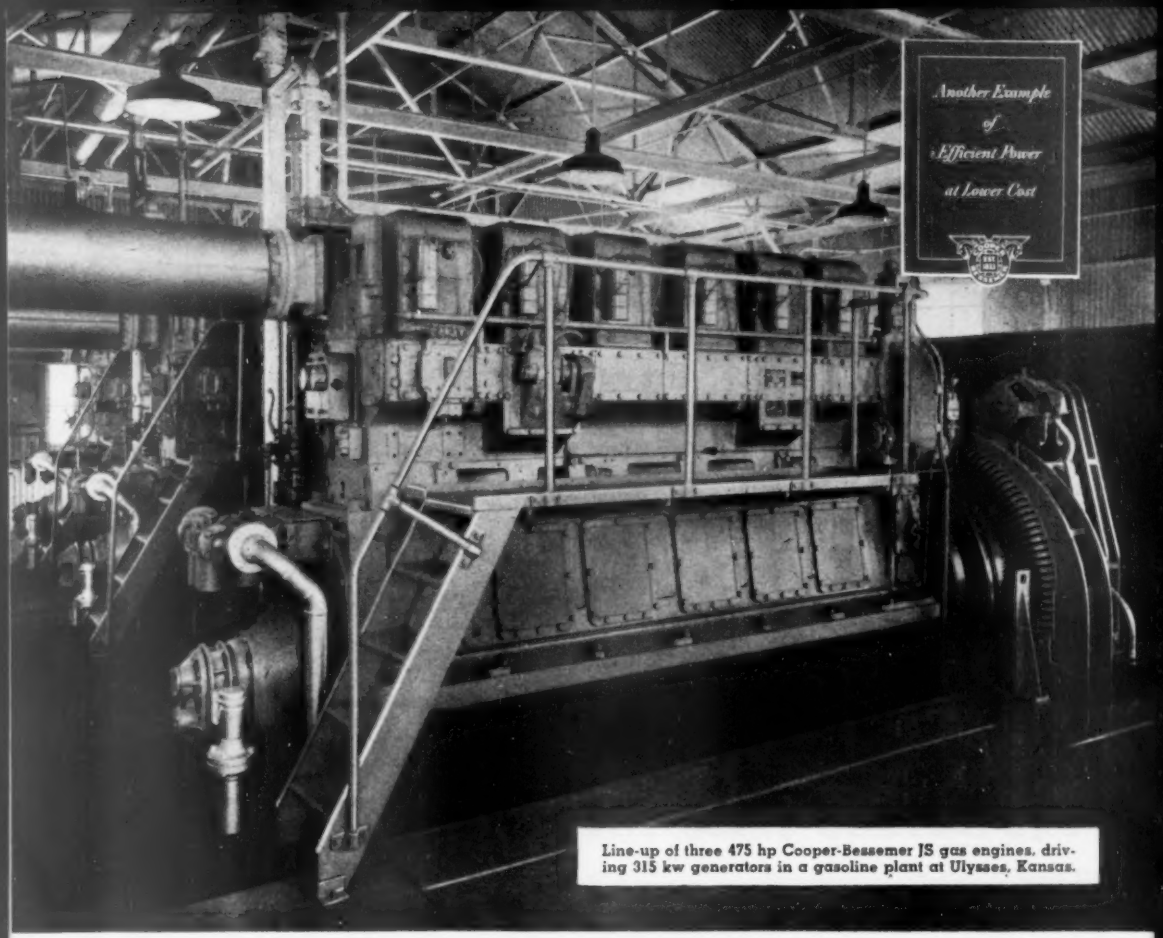
This first failure in a defect did not occur until the string had drilled some 50,000 ft. of hole. Since the whole string was retired at 66,634 ft., the defect, in spite of being extreme, reduced the life of the tube only 25 per cent.

The only other example in the Thompson-Carr string, of a failure induced by a mill defect was quite similar to the tube in Fig. 7 as to type of defect and mode of failure. This was tube No. 225, Grade D, shot-blasted and shot-peened. It failed in the twenty-fourth or very last well, just before the string was discarded, and is therefore credited with 66,634 ft. of hole (3,071 hours). It appeared that most of the paper-thin edge of the upturned seam had corroded away and the tube just escaped developing a crack entirely through the wall.

Stanolind String

The Stanolind string consisted of 200 lengths (5,800 ft.). There were 64 lengths of Grade D and 136 of Grade E. Sixty of the lengths contained the original mill scale, 75 were shot-blasted and shot-peened, and 59 were shot-blasted and plastic coated. The string drilled in seven Andrew and Ector County, Texas, wells. Instead of drill-

(Continued on page 130)



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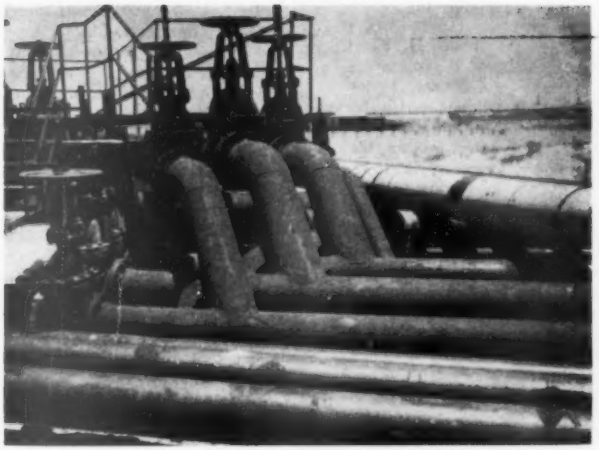
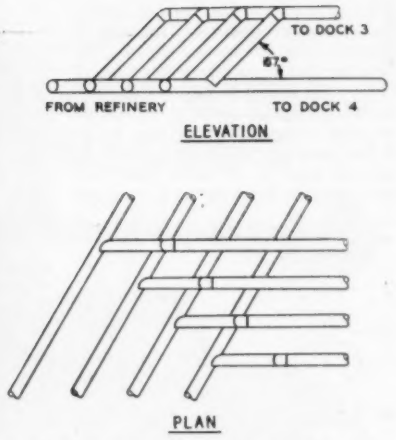
THE TRADE-MARK OF DEPENDABILITY



PIPE CONNECTIONS at Taylor's Corpus Christi terminal.



PLAN AND ELEVATION views of Corpus Christi connections.

How to Join Different Sizes Of Pipe at Odd Angles

Templates can be used to prevent "trial and error" cutting in the field; system is faster, neater, and more economical

by James H. Barnhart

IN piping problems it occasionally becomes necessary to saddle one pipe into another at an odd angle. The conventional method involves trial-and-error cutting in the field until the pipes fit properly. A method has been devised and is presented where a template can be used to mark the required cuts. This template eliminates the need for trial-and-error cutting, permitting more rapid and precise piping fabrication.

This template method was first used by Taylor Oil & Gas Co. at its Corpus Christi refinery. During modification of the cargo-loading system it was required to have parallel pipe lines serve two tanker docks. The arrangement of the piping at the junction of the lines from the two docks required intersections at an angle of some 67°. It was desired that the junction pieces be prefabricated in the refinery welding shops to minimize field welding. Pipe-cutting templates were used on this job and no difficulty was had with the installation of the prefabricated piping.

The templates were made as needed by refinery personnel using the equation derived below. Those used in the dock-line problem were cut from manila folders and were discarded at the end of the project. Permanent templates can be cut from service sheet or similar materials.

NOMENCLATURE

- **R** = outside radius of larger pipe.
- **r** = outside radius of smaller pipe.
- **T** = angle of intersection of pipes.
- **S** = angle around circumference of pipe to be cut.
- **W** = width of cut at angle S.
- **G** = longitudinal displacement of W from center line of smaller pipe.
- **m** = transverse displacement of W from center line of smaller pipe.
- **n** = vertical displacement of cut point from axis of larger pipe.
- **F** = vertical distance from minimum cut point to axis of larger pipe.
- **H** = G/tan T.
- **E** = distance from minimum cut point to axis of larger pipe along line of W.

Equation used . . . The template equation is a mathematical expression describing the shape of the cut to be made. Basic trigonometry and algebra are the only tools required in the derivation.

Field information consists of the diameters of the pipes and the angle of intersection.

The equation describing the developed template is:

$$W = \frac{r}{\sin T}\left[(R/r)^2 - \cos^2 S\right]^{1/2} \pm \frac{r}{\sin T}\cos T \sin S$$

The maximum value W can obtain is:

$$W_{max} = \frac{R + r\cos T}{\sin T}$$

$$\text{If } R = r,\ W_{max} = r\,\frac{1+\cos T}{\sin T}$$

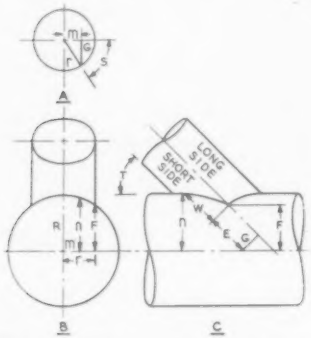
Application of equations . . . The calculations required to make a template involve substituting the values of R, r, and T into the proper equation. Values of W are then determined for various values of S lying between s = 0 and s = 180°, once for the long side and once for the short side. Fifteen-degree intervals in S are sufficient.

The material from which the template is to be prepared is cut a length 3 or 4 in. longer than W_{max} and a width equal to the outside circumference of the pipe to be cut. This width is taken to be 360° along which the values of S for which W have been computed are plotted. The lengths W are then measured from the corresponding locations of S. These points are connected by a smooth curve along which the template is cut.

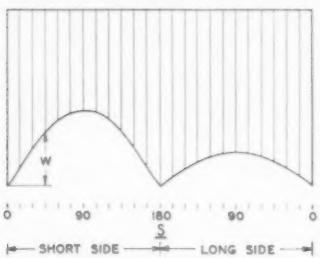
Use of template . . . The template is wrapped around the pipe at the loca-

tion of the desired cut, making certain the ends meet properly. The pipe is marked along the curved edge of the template and is cut along this line. A better fit will be assured if the cutting torch is held at an angle so as to bevel the edge of the pipe.

The template may also be used to cut the hole in the other pipe. For this operation the template is wrapped



DETAIL of pipe connections. (Fig. 1). A, section of small pipe. B and C, sections of joint.



TYPICAL TEMPLATE used for joining pipe of odd sizes. (Fig. 2).

around a short section of the smaller pipe, the whole being held against the larger pipe at the proper location. The template is then used as a guide for marking the larger pipe.

Typical application . . . As an example in the use of these equations the design of the template for a 4-in. line in the above dock-line problem will be given. Since both lines were the same size Equation 6 was used.

$$r = 2.250 \text{ in.}$$

$$T = 67°$$

$$\sin T = 0.921$$

$$\cos T = 0.391$$

Short side:

$$W = \frac{r}{\sin T} (1 + \cos T) \sin S$$

$$= 3.40 \sin S$$

Long side:

$$W = \frac{r}{\sin T} (1 - \cos T) \sin S$$

$$= 1.49 \sin S$$

		W	
S	Sin S	Short side	Long side
0	0	0	0
15	0.259	0.88	0.39
30	0.500	1.70	0.75
45	0.707	2.40	1.05
60	0.866	2.94	1.29
75	0.966	3.28	1.44
90	1.000	3.40	1.49
105	0.966	3.28	1.44
120	0.866	2.94	1.29
135	0.707	2.40	1.05
150	0.500	1.70	0.75
165	0.259	0.88	0.39
180	0	0	0

It will be noted that the values of W for S greater than 90° are the same as those for less than 90°.

When the values of S and W are plotted on the material and the template is cut it appears as shown in Fig. 2.

Derivation of Equations

These equations are derived as follows. Referring to Fig. 1A it is clear that:

$$G = r \sin S$$

$$m = r \cos S$$

$$m^2 = r^2 \cos^2 S$$

and a reference to Fig. 1B shows that:

$$F = (R^2 - r^2)^{1/2} \quad (1)$$

$$n = (R^2 - m^2)^{1/2} = (R^2 - r^2 \cos^2 S)^{1/2}$$

$$= r\,[(R/r)^2 - \cos^2 S]^{1/2} \quad (2)$$

From Fig. 1C it is seen that:

$$H = \frac{G}{\tan T}$$

$$H = \frac{G \cos T}{\sin T} = \frac{r \sin S \cos T}{\sin T} \quad (3)$$

Also

$$F = (E \pm H) \sin T \quad (4)$$

It will be noted that the pipe to be cut is divided into two sides, a long side and a short side. When referring to the long side the sign of H is minus and is plus when referring to the short side.

Substituting Expressions 1 and 3 into Expression 4 and rearranging leads to:

$$-E = \pm \frac{r \cos T \sin S}{\sin T} - \frac{(R^2 - r^2)^{1/2}}{\sin T}$$

In Fig. 1C it will be seen that:

$$W + E = \frac{n}{\sin T}$$

$$W = \frac{n}{\sin T} - E$$

Substituting values for n and —E gives:

$$W = \frac{[(R/r)^2 - \cos^2 S]^{1/2}}{\sin T} \pm \frac{r \sin S \cos T}{\sin T} - \frac{(R^2 - r^2)^{1/2}}{\sin T}$$

Since the last term of the above is constant in any given problem it merely serves to raise the curve of the template without changing its shape. Thus it may be omitted giving the equation:

$$W = \frac{r}{\sin T} [(R/r)^2 - \cos^2 S]^{1/2}$$

$$= \frac{r}{\sin T} \cos T \sin S \quad (5)$$

This is the basic template equation. It will be noted that the maximum value W can attain is:

$$W_{max} = \frac{R + r \cos T}{\sin T}$$

In cases where both pipes are of the same diameter the basic equation can be simplified since R = r. This results in:

$$W = \frac{r}{\sin T} (1 - \cos^2 S)^{1/2}$$

$$= \frac{r}{\sin T} \cos T \sin S$$

$$= \frac{r}{\sin T} \sin S \pm \frac{r}{\sin T} \cos T \sin S$$

$$= \frac{r}{\sin T} (1 \pm \cos T) \sin S \quad (6)$$

This simplification also gives:

$$W_{max} = r \frac{1 + \cos T}{\sin T}$$

THE AUTHOR

James H. Barnhart is process engineer for Taylor Oil & Gas Co., in McAllen, Tex. After joining the company in 1947, he worked at Corpus Christi and Port Isabel prior to his present assignment. He graduated from Texas A. & M. College in 1947 with a B.S. degree in chemical engineering. He served for 3½ years as a field artillery officer in World War II.

Acknowledgment

The author expresses appreciation to Taylor Oil & Gas Co. for permission to publish this article.

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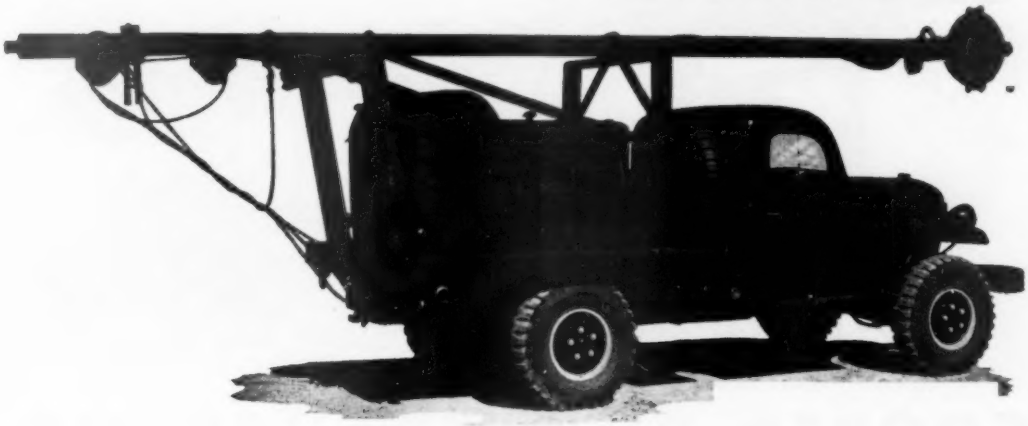

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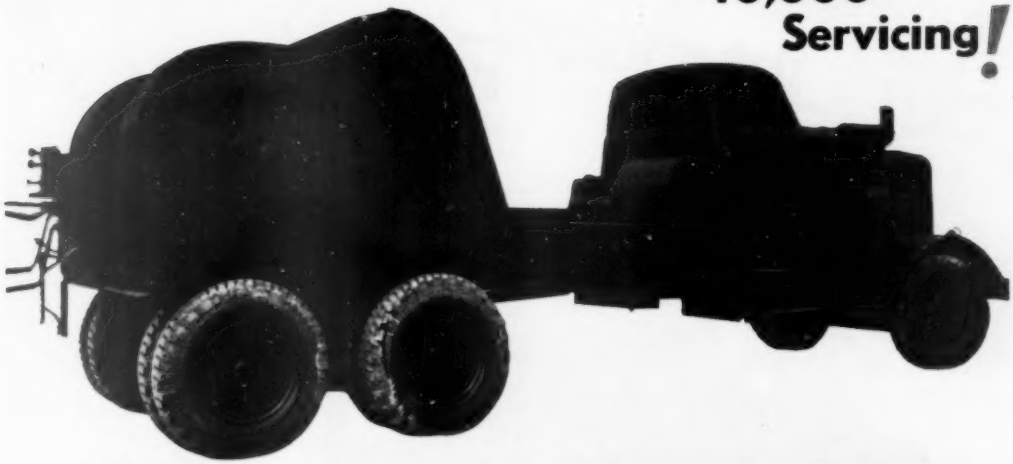

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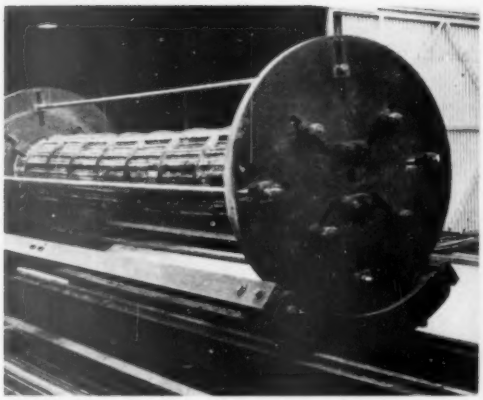
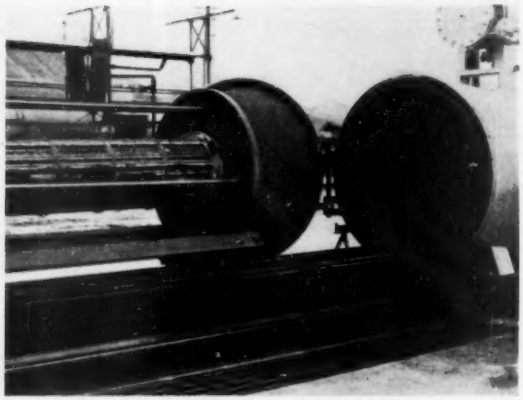


Fig. 1—Tube bundles are mounted on this rotating dolly, between two centering plates. The entire assembly is then moved to . . .



. . . the cleaning vessel on a carriage whose top rails match in height the rails welded to inside of vessel shell. Fig. 2.

New Unit Really Cleans Tube Bundles

Method is mild but thorough. Advantages: cleans inside and outside tubes of bundle down to bright metal; by avoiding harsh abrasives, tube-bundle life is extended.

by R. T. Effinger* and G. T. Holt*

A COMBINATION of solvent extraction and soaking has proved highly effective in cleaning heat-exchanger tube bundles at Shell Oil Co.'s Martinez, Calif., refinery.

Since it does not rely on scraping, abrasive or jetting actions, this chemical cleaning technique gives good uniform results in removing shell-side deposits from all tubes of a bundle, including the hard-to-reach center tubes. Bundles that cannot be effectively cleaned by mechanical means because of 60° layout or insufficient pitch, present no problem.

The Shell method involves the use of well-known solvents and cleaners. But it differs from normal procedure in putting them to work under the most efficient conditions possible. These conditions are provided by a specially designed cleaning unit, built largely from materials at hand by Martinez engineers. Two years of operation have proved the unit practical and successful.

The cleaning unit provides both vapor and liquid-phase extraction in an enclosed cylindrical vessel. In general, oily deposits are most easily removed by vapor-phase extraction using a hydrocarbon solvent. This is accomplished by providing the conditions for continuous solvent distillation and condensed liquid reflux. Dry or carbonaceous scales are most effectively removed by soaking bundles in a hot liquid cleaner. The best possible conditions for this type of cleaning are provided by rotating the bundle slowly in a liquid bath at controlled temperature.

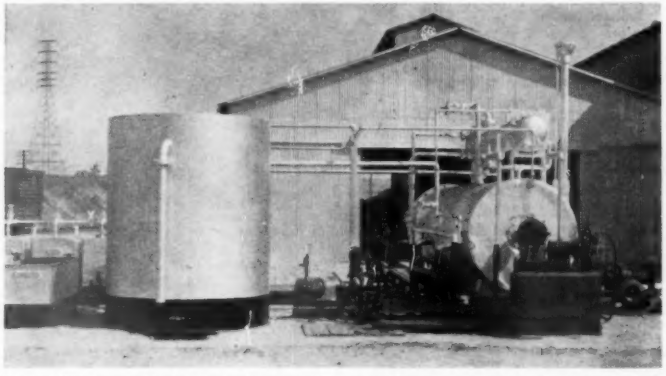


Fig. 3—This chemical cleaning unit, comprising an enclosed vessel and auxiliaries, was built by Shell Oil Co. at Martinez, Calif.

Unit Details

The cleaning vessel measures 17 ft. 7 in. in length and 4 ft. 5 in. in diameter, and will accommodate all standard sizes of tube bundles up to 36 in. by 192 in. The lower half of the shell is steam jacketed and the entire vessel, with the exception of a hinged end door, is insulated.

During cleaning, the tube bundle rests on a dolly which is slowly rotated from outside the vessel by a 5-hp. electric motor operating through a speed reducer. The bundle and dolly assembly travel between the boiler shop and the outside cleaning unit on a carriage mounted on surface rails. (Fig. 1 and 2.

Volatile solvent is stored in two 125-gal. closed tanks, and two 2,000-gal. tanks handle nonvolatile cleaning solutions. An open 125-gal. mixing vat is provided for preparing liquid cleaner.

*Shell Oil Co., Martinez, Calif.

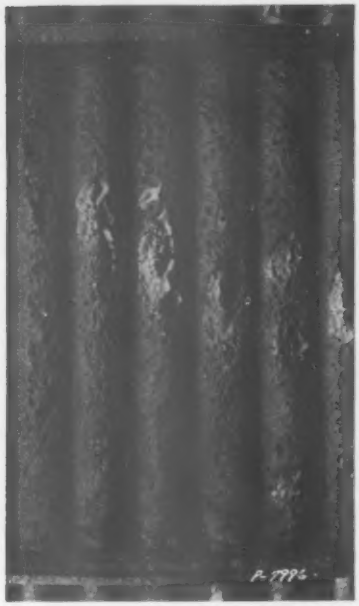


Fig. 4—This crude-residuum heat-exchanger bundle has just been removed from service for chemical cleaning.

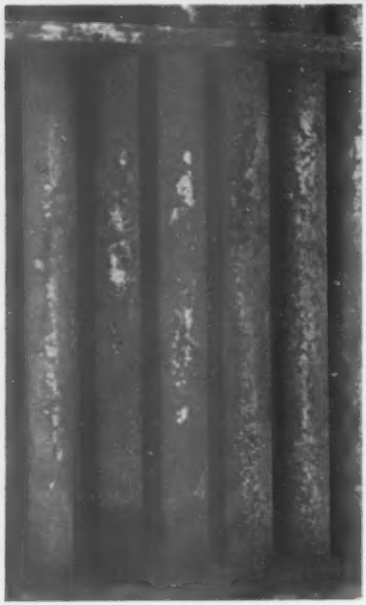


Fig. 5—The same bundle after 24 hours of extraction with TS-11, aromatic hydrocarbon solvent.

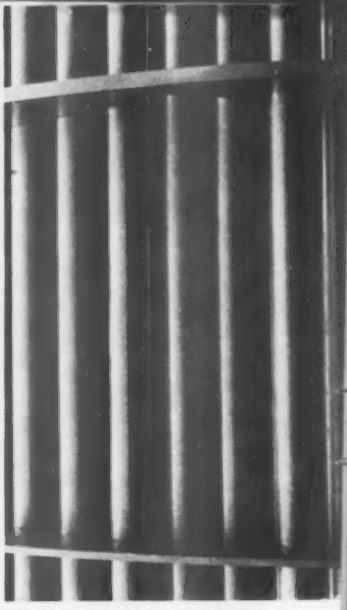


Fig. 6—Same bundle after soaking for 48 hours in hot Oakite 88. All tubes cleaned to bright metal.

This system is served by a single centrifugal pump, rated at 50 g.p.m. and equipped with a Worthite case and impeller. The pump is manifolded for loading, unloading, or circulation of solvents. A float-type level control is mounted on one of the volatile storage tanks, with the motor valve on the discharge of the pump. During vapor-phase extraction, this control permits condensate recycle to equal the distillation rate in the heated cleaning vessel.

Cleaning Procedure

The bundle to be cleaned is mounted on the traveling dolly between two centering plates which are bolted to the tube sheets. One plate is movable to accommodate tube bundles of varying lengths. Each plate is mounted on rollers which permit the bundle to rotate freely. The carriage is then rolled to the cleaning vessel and the dolly assembly is rolled into the vessel on rails welded to the inside of shell.

Drive lugs on the dolly's fixed centering plate are engaged by a drive shaft which enters the vessel through a packed gland in the fixed head. The dolly is then locked in place and the hinged door of the vessel is closed and bolted.

The vapor-phase cleaning operation is then begun. Approximately 300 gal. of volatile solvent are charged to the vessel and steam is admitted to the outer jackets. Water is turned through the vapor condenser and rotation of the element is begun. Liquid solvent from the condenser is returned to that solvent tank equipped with the liquid-level control, and is recycled to the vessel through a line running the length of the vessel at the top. This inside line is equipped with jets pointed at the bundle.

At the end of the solvent-cleaning period, the recycle is shut off and solvent is distilled overhead, condensed, and returned to solvent storage for reuse. The vessel is steamed out before opening, by introducing steam through the recycle line and opening the drain.

When the cleaner is opened the bundle is pulled out on the carriage and immediately washed with hot water. The vessel interior is also washed down at this time. Removal of as much solid material as possible at this stage greatly increases the effectiveness and

(Continued on page 147)

TABLE 2—COMPARISON OF EXPENDITURE

	Type of Cleaning			
Labor, man-days	In Place	TS-11 Hand Scraping	TS-11 Spent Soda	TS-11 Oakite 88
Riggers	0	2	2	2
Fitters	3	2	2	2
Boilermakers	1	7	3	3
Utilities				
Electricity, kw.-hr.	100	100	300	300
Steam, M lb.	0	7	8	8
Cooling water, hrs., at 30 g.p.m.	0	20	72	72
Chemicals				
Kero extract, gal.	300	0	0	0
TS-11, gal.	0	30	30	30
Spent soda, gal.	0	0	1,000	0
Oakite 88, lb.	0	0	0	100

TABLE 1—COMPARATIVE CLEANING TRANSFER RATES

Unit, Service, Type Cleaning—	U* Before	U* After	Hrs Unit Offstream	Labor Man Days† Required	Heat Transfer MM b.t.u. per hr. Before	Heat Transfer MM b.t.u. per hr. After	Heat Saved MM b.t.u. per hr.	Surface sq. ft.
Dubbs, Feed per Resid., TS-11—hand scraping	15	40	100	11	3.0	7.7	4.7	1,170
Dubbs, Feed per Resid., TS-11—Spent Soda	15	45	80	7	3.0	8.3	5.3	
Dubbs, Feed per Resid., TS-11—Oakite 88	17	55	80	7	3.3	9.8	6.5	
D.U. 4, Crude per Resid., Kero ext. (in place)	16	20	30	4	—	—	—	873
D.U. 4, Crude per Resid., TS-11—Hand scraping	8	33	100	11	1.5	*5.7	4.2	
D.U. 4, Crude per Resid., TS-11—Spent soda	12	40	80	7	2.2	6.5	4.3	
D.U. 4, Crude per Resid., TS-11—Oakite 88	16	50	80	7	2.7	8.2	5.5	

* U — over-all heat-transfer coefficient — b.t.u. per hr. x °F. x sq. ft.
† Total labor charges including disconnecting, transportation, cleaning, and reassembly.

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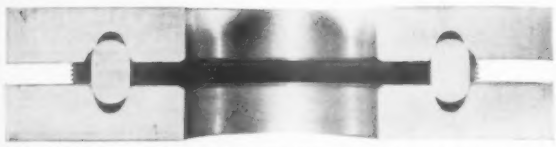
Corrosion-proofed steel and a pressure-tight seal *with Hycar!*



Cross-section view of an API Flanged Connection with Double-O Safety Seal Ring inserted between the flanges.

EVEN steel ring gaskets can't always provide a fool-proof seal for flanged connections in well head assemblies and drilling control manifolds. Highly corrosive fluids and gases may attack the steel. Or, insufficiently tightened flange studs, extreme pressures, and accidental damage to the steel ring often result in an imperfect seal.

An auxiliary seal ring was needed —and Hycar rubber was a "natural" for the job. The seal manufacturer found in Hycar every necessary quality—produced a seal ring made of two O-rings joined together by a web. The Hycar rubber resists oil, gas, abrasive mud, heat and cold, many chemicals. It protects the steel ring against corrosion. And, if the steel ring should fail, the Hycar rubber seal takes over—provides a pressure-tight seal.

Hycar rubber is used in many petroleum industry applications—with tubing hangers, bottom hole regulators, scraper traps, pipe couplings and other units. Perhaps one of the many Hycar rubber compounds can help you develop or improve a product, to bring in more sales. For technical information, please write Dept. HI-12, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ont.

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American Rubber

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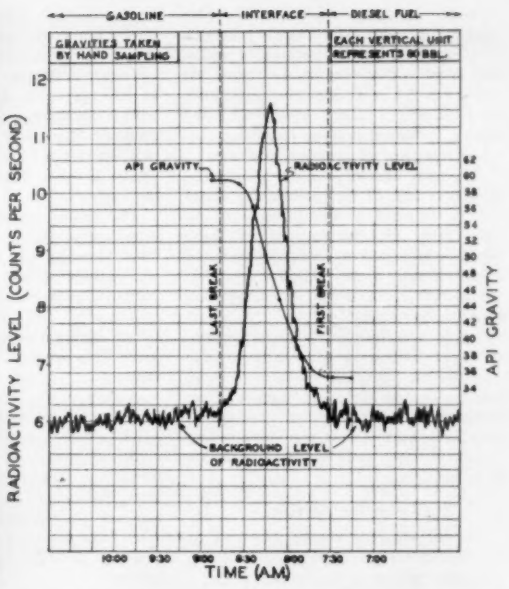
This specially designed injection cabinet at Salt Lake City introduces a few cubic centimeters of oil-soluble radioactive antimony at the junction of different products entering the Salt Lake Northwest Pipe Line. Proper shielding protects operators from harmful radiation.



Eighteen days after injection, radiation emitted by this gasoline-diesel oil interface is recorded at Pasco, Wash., 569 miles distant. The superimposed gravity curve, obtained from careful hand sampling of the mixed stream, shows close correlation with the radiation chart.

Radioisotope Tracer Successful in Products-Pipe-Line Application

New technique wins unanimous approval of operating men as it demonstrates its many benefits during 2 years of operation

by George Weber
Refining Editor

THE use of radioisotopes for marking pipe-line product interfaces has proved to be an unqualified success. Following nearly 2 years of practical application in Salt Lake Pipe Line Co.'s 556-mile Northwest Products line extending to Pasco, Wash., the new technique has gained the unanimous approval of operating men.

They note numerous advantages over conventional methods for identifying and measuring product interfaces. Station operators like the new tracer technique because it gives them an accurate picture of the mixed stream at the junction of two products. At the terminus and at key distribution points, operators must make interface cuts. The radiation chart of the interface at those points permits operators to calculate exactly where to cut the interface to maintain required product specifications at the same time reducing the volume of mixed product which must be diverted to slop storage for rerun.

Dispatchers benefit from a constant check on the exact location and width of all interfaces in the system. Daily reports from all stations permit them to maintain a corrected visual graphical plot of the line's content. As a result, a difficult operation involving the movement of many small tenders over long distances to numerous intermediate take-off points has become greatly simplified.

Salt Lake's operation is the first of its kind. The isotope method was developed by engineers of the affiliated California Research Corp.[1] It consists of injecting a small volume of irradiated oil-soluble antimony compound into the interface between product batches as they are introduced into the line at Salt Lake City.

The line operates on a system of separate tenders which average about 22,000 barrels. All interfaces are marked whether they be between dissimilar products, or similar products of different shippers.

At the junction of two products moving through a pipe line, admixture takes place in general conformance with the theoretical rate of diffusion for turbulent flow. Salt Lake engineers have found that in practice, diffusion of the radioactive solution follows the same pattern. Therefore, the varying radiations from a product interface

represent an exact function of the proportions of the two mixed products. The first and last indications of radiation from within the line represent the limits of the mixed product interface as it passes a fixed point, and the highest radiation reading identifies center or midpoint of product interface.

At each delivery point along the system, a nest of Geiger-Mueller counters is strapped to the outside of the line. The amplified output of these tubes is fed into a specially designed counting rate meter which in turn is connected to a strip-type chart recorder.

Single installations of this type were made at Salt Lake City and at five intermediate points on the system where only heart cuts are made from the line. They serve to show the passage of interfaces and permit the operator to withdraw only pure product between such interfaces.

Cutting the Interface

At the terminus of the line and at two key intermediate stations, operators must switch products at the interfaces. At each of those points, the operation has been simplified by installing a second, advance telemetering station a few miles upstream from the pump station. This gives the operator an advance picture of the approaching interface. Having determined the exact point in the interface at which he must switch product, he locates that point on the advance radiation curve, and thus is prepared to act promptly when that point is reached on the instrument charting the interface at the station.

Where to cut the interface is determined by the products involved. At the junction of similar products from different shippers, the switch is made at the center, or radiation peak. Flash point, octane, and other specifications determine where cuts are to be made between dissimilar products.

For example, when cutting a gasoline-diesel fuel interface, the operator must limit the amount of gasoline withdrawn with diesel oil, so that the flash point of the latter tender does not exceed the allowable. When switching alkylate from an alkylate-gasoline interface, the cut is made at the alkylate end of the interface limit to prevent any contamination by gasoline. In cutting premium-regular gasoline interfaces, the octane requirements of the high grade determine where the cut shall be made.

At Boise, Idaho, a principal withdrawal point, a further refinement has been added to aid the operator in making accurate interface cuts. Having picked the switching point on the recorded radiation curve from the advance or telemetering station, he measures that point in per cent of maximum radiation. A dial meter, installed at the valves is set to record the full-scale deflection shown on the chart as 100 per cent. Thus, if the operator wishes to switch at the 75 per cent point on the leading side of the interface, he stands by at the valves and acts when the dial meter first rises to 75 per cent.

The tracer interface has found another application in preventing product contamination at intermediate pumping stations. These remote stations are operated automatically by line flow requirements, and thus might be shut down during the passage of an interface. This would result in some contamination should the station resume operation during the passage of a different product. To prevent this, a Geiger-Mueller counter nest is installed upstream from the station. The radiation of an approaching interface automatically brings the station on operation for a fixed period, clearing manifold lines and pump of the leading product as the interface passes the station.

Radiation instruments have also proved useful when running pipe-line scrapers. Radioactive cap screws attached to the scraper warns operators of its approach. Particularly when the line was new, this advance warning permitted operators to bypass meters and divert the heavy sludge preceding the scraper to slop tankage. Thus excessive damage to meters and pumps and plugging and collapse of strainer baskets was avoided.

Correlation with Gravities

The accompanying chart[2] shows a comparison of gravities with the radiation curve of a gasoline-diesel oil interface. This chart, taken at Pasco, shows a peak radioactivity level of 11½ counts per second for the interface into which the injection was made at Salt Lake City 18 days earlier and 556 miles upstream.

Carefully timed hand samples were taken during the passage of the interface to determine the changing A.P.I. gravities of the mixture. The radiation curve which was traced directly from the recorder chart shows a background radiation averaging six counts per second. This "hash" results from natural radioactivity of the area and from random cosmic rays.

It is noted that the first break in radiation level occurs before the first indication of product mixture by gravity check. The radiation peak corresponds closely to the midpoint in the gravity curve. Finally, the last break in the radioactivity level can be picked up more sharply than the leveling-off point in the gravity curve.

In practice, engineers have found that the rate of product mixing generally follows theoretical values which are based on flow through a level line. In traversing the Intermountain area, the system has a fairly rugged profile, and on occasion the interface between two dissimilar products departs from the theoretical. In such cases the radiation chart correctly indicates abnormal product commingling.

During normal operation, a product interface at Ogden, 35 miles down the line from Salt Lake, shows a width of about 5 to 6 minutes on the chart, representing an allowable interface of 25 to 30 bbl. At Boise, after moving through 328 miles of line, the interface has widened to about 300 bbl., taking about 30 minutes to pass that point. By the time an interface reaches the terminal at Pasco it has reached an allowable width of 400 bbl., and shows a radiation curve extending over an hour.

The first and last breaks in the radiation curve which mark the extreme limits of an interface indicate the presence of very minute fractions of the lesser product. For practical purposes, a fraction of this total, called the allowable interface, is used in switching products. Its relative volume is determined by the characteristics of the two commingled products.

No Danger

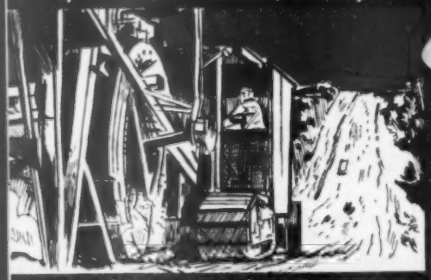
Radiological precautions are necessary only at Salt Lake City where the isotope solution is injected into the line. Once in the interface, the isotope generally shows less radiation than a luminous watch dial. Increased diffusion, combined with the continual decay of the 60-day half-life antimony 124 isotope, reduce radiation to a point down the line, where further amplification of the Geiger-Mueller impulses becomes necessary to obtain a clearly readable radiation chart.

Dispatching Methods

A well-organized dispatching system permits the chief dispatcher at Salt Lake to notify station operators of approaching interfaces within minutes of their arrival down the line. This control is made possible by use of a visual graphical method for plotting the location of all products in the line at all times.

Since many products of more than one shipper are handled in separate tenders, their proper introduction to the common-carrier line requires careful prior planning to avoid serious contamination. Tendered amounts of products usually exceed the line's capacity, so the first step in planning operation for any given period is to prorate line space and notify shippers of the volumes

Spread One . . . Princeton, Kentucky



Spread Two . . . Dyersburg, Tennessee

Spread Three . . . Memphis, Tennessee

Spread Four . . . Clarksdale, Mississippi

4 OF A KIND

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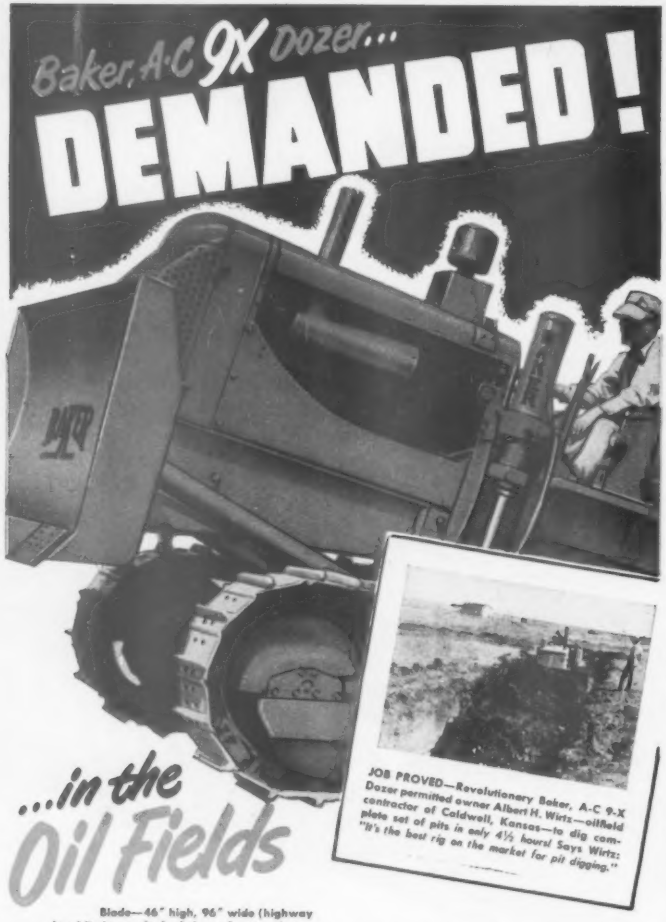
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that can be handled. Shippers then return a schedule of their desired pumping sequences to suction storage and their dates of production of the various products to be shipped.

The pipe line honors these requests as closely as possible and builds a tentative suction sequence for a calendar month, several weeks in advance. When this plan has been made firm by shipper approvals, each shipper is then told what day of the month his product will be introduced to the line, and on what day or days it will be delivered at the terminus or desired intermediate points.

In setting up the monthly schedule, careful consideration is given to the sequence of products to minimize wherever possible down the line, the existence of dissimilar product interfaces. Premium gasoline is always introduced to the line between two batches of regular gasoline. Alkylate, which is handled periodically for transshipment to the San Francisco area, is cushioned with gasoline at both ends all the way to Pasco.

From the monthly operational plan, weekly forecasts of pumping orders are then drawn up. Data are plotted on a graphical chart which shows the progressive positions of all tenders in the line for a period of 8 days, beginning and ending on Monday. The base of this chart represents the length of the line from Salt Lake City to Pasco. It is scaled in barrels of product in the line. Also plotted along the base are all delivery points, and a profile of the right-of-way.

The ordinate of the weekly chart is a time scale. The progress of each tender through the line during that week is then plotted as a series of superimposed colored lines. Ecah product is assigned a different color. The slope formed by the locus of interfaces at the Salt Lake City end of the chart represents the rate of product movement, in barrels per day. As scheduled withdrawals are made at intermediate delivery points along the system, the horizontal lines representing each product are shortened to represent the correct volume of product remaining in the line. The weekly chart serves as a basis for notifying all station operators within 2 hours, when certain products will arrive at their respective stations.

From the weekly plot, daily charts are drawn up on the same base with the time ordinate scaled in hours. These charts, plotted 1 day in advance, contain further corrections which permit the dispatcher to predict passage of an interface with an accuracy of 7 to 8 minutes, on the average.

True volume of the pipe line is 183,571 bbl. Products are pumped against some back pressure, since a

"packed" operation minimizes interface mixing. Thus, the line actually contains on the order of 187,850 bbl. of products, as metered at atmospheric pressure. Knowing the metered volume of total product in the line at all times, the dispatcher computes a daily factor by dividing the true volume of the line by the total volume of 60°-barrels of product in line. This factor is applied to all metered tenders introduced into the line so that the visual chart will show the true volume occupied by the products.

Future Operations

The efficient combination of careful dispatching and employment of radioactive interface markers will prove of even greater importance as the pipeline system is expanded. A second 8-in. line is being laid from Salt Lake City to Boise and initial pump station capacity is being added to expand the line's capacity out of Salt Lake City from its present 22,000 bbl. per day to 39,000 bbl. per day.

This will simplify the operation as far as Boise, permitting the handling of gasolines in one line and heavier products in the other. Boise will become a rescheduling point for all products moving further. This will require the erection of additional storage capacity, and the installation of a second tracer injection cabinet.

The growing potential market for petroleum products in the Intermountain area and the Pacific Northwest indicates a steady increase in product movement through the Salt Lake Pipe Line. As a common carrier, it presently ships products for both Utah Oil Refining Co. and Salt Lake Refining Co., handling about nine different products as separate tenders. Later this year, Phillips Petroleum Co. will commence shipping through the line.

Pioneer Pipe Line Co. plans to complete a products line linking Sinclair Refining Co.'s refinery at Sinclair Wyo., with Salt Lake City, and a substantial part of the products transported will be shipped northward through the Salt Lake Pipe Line System.

The likely result is a substantial increase in product movement from Salt Lake City to the Northwest, which may ultimately double the number of tenders to be handled by the Salt Lake Pipe Line. The tracer technique, already a proven success, will probably assume even greater importance in future operations on that line. California Research Corp. has filed patent applications on the subject matter.

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Oakford Project

(Continued from page 99)

have caused the supplies of fuel gas and of regeneration gas to the furnace to be automatically shut off.

Fig. 3 shows the piping arrangement at the towers. The 18-in. wet-gas inlet line is the vertical pipe at the left which splits into two 12-in. lines, one entering the top and the other entering the bottom of the tower to the left. The butterfly valves which control the split of gas are shown above and below the tee. The orifice meters which measure the split in flow volumes are in the horizontal sections of 12-in. line.

The 18-in. dry-gas outlet line leaves the tower at the middle. This connection is also piped for hot-gas inlet and cold-gas inlet. The 12-in. hot and cold-gas outlet lines from the top and bottom of the tower are at the right side of each tower.

Automatic valves . . . In this design the gas flow to and from each of six dehydrating towers is controlled through six valves at each tower. These valves are an 18-in. automatic valve in the

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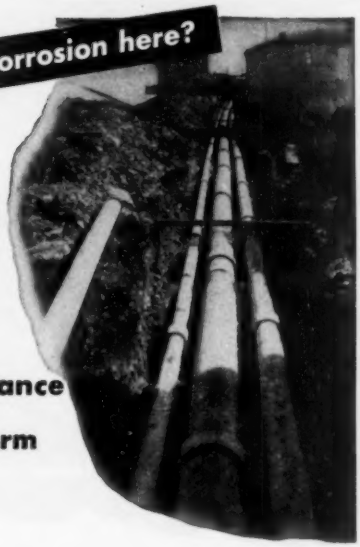

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18-in. wet-gas inlet line, an 18-in. automatic valve in the 18-in. dry-gas outlet line, an 8-in. automatic valve in the cold-gas inlet line, a 12-in. automatic valve in the cold-gas outlet line, a 12-in. automatic valve in the hot-gas inlet line, and a 12-in. automatic valve in the hot-gas outlet line. An 8-in. automatic valve AV-37 is placed in an 8-in. bypass line between the cold-gas headers in order to bypass the tower cooling and to provide a continuous flow of regeneration gas during the valve change period when, for a few minutes, no tower is on cooling.

These valves are of the plug type, each operated by an electric motor. Control of these valves is either manual by unit pushbutton controllers or automatic by a timer control panel which energizes the electric motors in proper sequence at the proper time. They may also be operated by hand. All of these electric valve controls are operated on 480 volts a.c.

Instrumentation . . . The dehydration plant is completely automatic and requires only part time supervisory attendance.

The valve change cycle is controlled by an automatic timer panel to perform the following sequence of operations each time that it is necessary to change over a tower from drying service to regeneration, with replacement of a regenerated tower to drying service:

1. Open the regeneration-gas bypass valve AV-37. (This diverts regeneration gas flow to the heating cycle only.)
2. On the tower that has just been cooled: (a) Close the "cold gas in" and "cold gas out" valves. (b) Open the "wet gas in" and "dry gas out" valves. (This puts a fifth tower on drying service with one on heat.)
3. On the tower that is to be regenerated: (a) Close the "wet gas in" and the "dry gas out" valves. (b) Open the "hot gas in" and the "hot gas out" valves. (This puts two towers on heat with four on drying service.)
4. On the tower previously on heat and now to be cooled: (a) Close the "hot gas in" and the "hot gas out" valves. (b) Open the "cold gas in" and the "cold gas out" valves. (This puts one tower on cooling, with one on heat and four on drying service.)
5. Close the regeneration-gas bypass valve. (This reestablishes flow in the tower cooling circuit.)

The valve change cycle interval is adjustable between 10 minutes and 10 hours and is automatically controlled from a Ford, Bacon & Davis-designed, Russell & Stoll Co.-built, explosion-proof control panel. Figs. 4 and 5 show the front and back views of this panel. All valve changes are controlled by a single recycling timer and eight relays. An additional timer operates to sound an alarm if a valve change cycle is not completed within approximately 3½ minutes.

A simplified, color-coded flow diagram and colored indicator lights on the control panel provide constant indication of the process being performed by each tower and the positions of each valve. Pushbutton control and a manual automatic selector switch are provided for manual control of each of the 37 motor-operated valves. The control panel also provides a number of Unilarms to supervise the complete operation of the dehydration plant and provide visual and audible alarms should any abnormal condition occur. Process gas flow and temperature, furnace flame condition and stack temperatures are supervised by these Unilarms and any abnormality shuts down the dehydration process by extinguishing the furnaces, closing the air-operated isolating valves at each furnace, and shutting down the process gas compressor. The failure of any control device will also cause shutdown.

The furnaces are ignited remotely by manual pushbutton. Indicator lights advise the operator when the four pilots in each furnace have been ignited and also whether the electrical ignition system is operating. The furnace pilots can be ignited only when the main burners are shut off.

This dehydration plant has been designed to provide the greatest possible protection to plant and personnel against mechanical or human failure.

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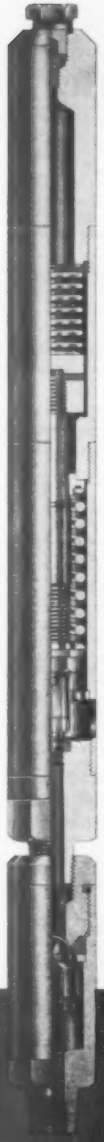

Do Clogged Orifices

throw your wells

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Camco has recently introduced a new constant flow valve which puts an end to the problem of clogged orifices and the limiting factor of fixed orifices. Thus, Camco has again pioneered another outstanding advancement in gas lift equipment, having worked on the new development for several years.

In this new Camco Type "CMC" Gas Lift Valve, an increase of gas pressure above normal operating pressure will draw the stem entirely out of the seat and free it of all foreign matter. When the pressure is reduced back to normal, the stem returns to normal operating position with a clean orifice.

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The Camco Type "CMC" constant flow valve is available for use in retrievable valve installations.

Contact your Camco representative or write for details of this newest development by Camco, the leader in the gas lift field.

CAMCO

CAMCO, INC.

New Method for . . .

Direct Determination of Bottom-Hole Pressures

by John R. Spencer* and William L. Boyd†

THE calculation of static bottom-hole pressures in gas wells from shut-in tubing pressures has been reviewed lately by Rzasa and Katz,[1] Fowler,[2] and Poettmann.[3] These methods require either a trial-and-error solution using an average fluid density equal to the density at the average temperature and pressure in the gas column, or a direct solution using a chart or tables where the function

$$\int_{P_{s1}}^{P_{s2}} \frac{Z}{P_s}\, d\,P_s$$

has been integrated graphically.

In the majority of the cases where such calculations are made, the only field data available are the shut-in tubing pressure, average producing depth, and gravity of the well stream. Therefore, a number of calculations of gas gradients were made using various combinations of gravity, depth and shut-in tubing pressures; and it was found that a chart could be prepared from which the static bottom-hole pressure may be determined directly with an accuracy comparable to that obtained with the more laborious computational methods described above.

This chart was prepared for an average geothermal gradient of 1.6° F. per 100 ft. of depth plus an average surface temperature of 74° F. Pressures are in pounds per square inch absolute and it was assumed that the gas was composed of the usual hydrocarbons free of any large amounts of nitrogen, carbon dioxide, hydrogen sulfide, etc., which could affect its compressibility.

The chart may be used in the following manner:

1. From the proper well-stream gas gravity move vertically to the shut-in tubing pressure in psia.

2. Then move to the left in a horizontal direction to the well depth (depth to the middle of the perforated interval).

3. Then go in a vertical direction again to the scale along the top of the chart to obtain the difference between the tubing pressure and the bottom-hole shut-in pressure.

4. This difference is then added to the tubing pressure to determine the shut-in bottom-hole pressure in psia.

If the temperature gradient of the well in question is other than 1.6° F. per 100 ft. + 74° F., a small temperature correction can be made using the following formula:

$$P_{BC} + (0.005)\,(G)\,(L/1{,}000)\,(1.6 - R) \times (P_{BC}) = P$$

where

P_{BC} = bottom-hole pressure obtained by the correlation
G = gas gravity (referred to air = 1)
L = depth of perforated interval, ft.
R = actual temperature gradient
P = corrected bottom-hole pressure

If the known temperature gradient in the well is less than 1.6°, the correction would be additive and, if greater, the correction would be subtracted from the pressure determined by the correlation to obtain the corrected pressure.

It may be noted from the chart that an accurate estimate of the well-stream gas gravity is essential. If an analysis of the well-stream gas is not available, the gravity may be calculated, in the case of distillate wells, from the following equation:

$$G_w = \frac{G_s + (4{,}591\,G_D)/GOR}{1 + (1{,}123/GOR)}$$

where

G_w = well-stream gas gravity
G_s = separator gas gravity
G_D = specific gravity of condensate
GOR = gas-oil ratio, cu. ft. per bbl.

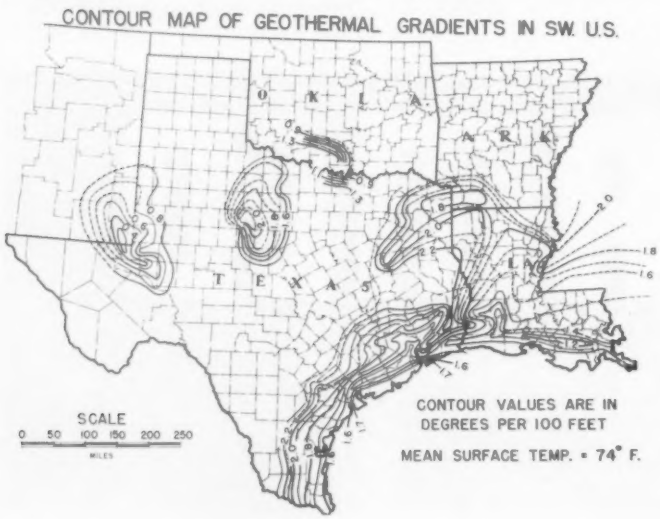
Or, a simpler but slightly less accurate equation may be used which utilizes the same nomenclature:

$$G_w = (1 + 4{,}375/GOR)\,G_s$$

In the case where the geothermal gradients in the southwestern area of the United States are not known, a map prepared by Nichols[4] gives reasonable estimates. In general, the temperature gradient correction is small so that reasonable accuracy (within 2 per cent) may be obtained even when the temperature gradient correction is not applied.

The correlation was tested against 32 measurements of bottom-hole pressures by the bomb method with an average deviation of 0.21 per cent from the observed pressures.

Although the chart provides an interval of 4,000 to 10,000 ft. for the well-depth parameter, it is believed that the parameter can be extrapolated to shallower depths without affecting the accuracy of the results since the function is essentially linear at depths less than 4,000 ft.



*Senior reservoir engineer and †reservoir engineer, production department, Continental Oil Co., Houston.

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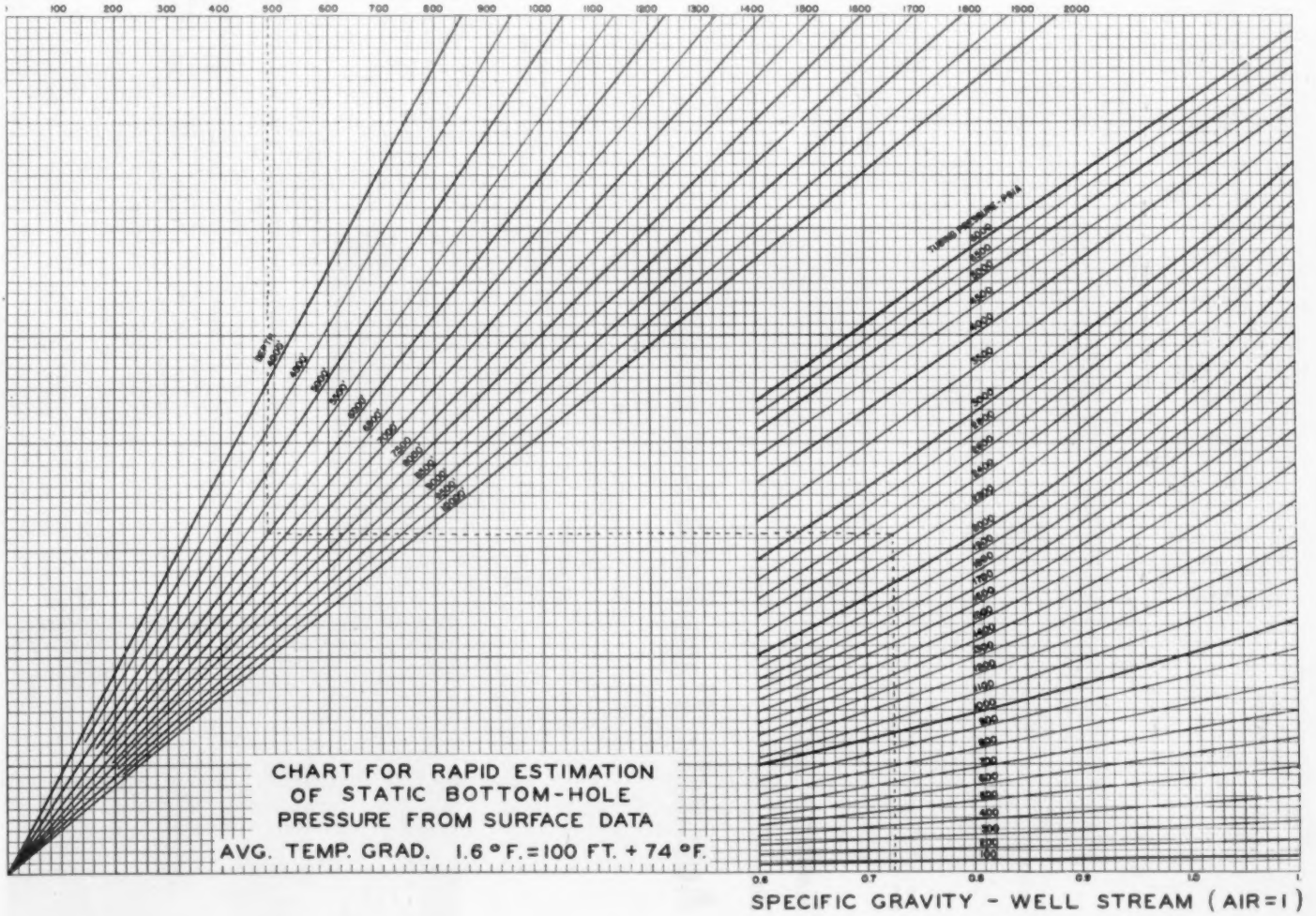
(BOTTOM-HOLE PRESSURE) - (TUBING PRESSURE) - PSI.
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TUBING PRESSURE - PSIA
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0.9
1.0
SPECIFIC GRAVITY - WELL STREAM (AIR=1)
CHART FOR RAPID ESTIMATION
OF STATIC BOTTOM-HOLE
PRESSURE FROM SURFACE DATA
AVG. TEMP. GRAD. 1.6 °F.=100 FT. + 74 °F.

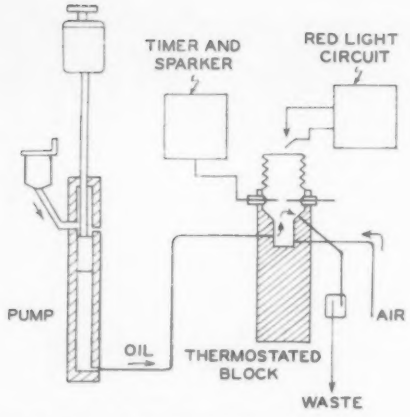


Fig. 1—Schematic diagram showing principle of operation of automatic flash-point instrument.

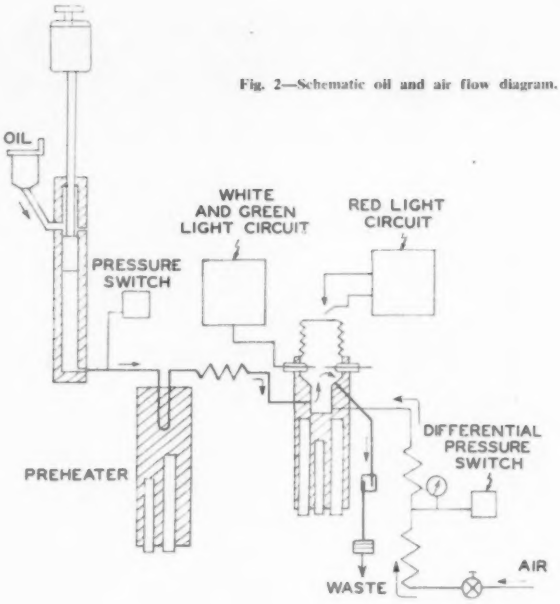


Fig. 2—Schematic oil and air flow diagram.

Standard of Indiana Develops New

Automatic Flash-Point Instrument

Device determines whether a sample of oil will flash at a predetermined temperature. Under normal conditions the instrument is self-flushing.

by R. B. Jacobs*

Fig. 3—Commercial instrument in use.

AN automatic flash point device has been developed by Standard Oil Co. (Ind.) for use with petroleum products. The machine determines whether or not a sample of oil will flash at a predetermined temperature. Accuracy is comparable with that of the best laboratory methods, and the measurement (entirely automatic after a sample has been loaded) requires only 2½ minutes, as compared to about 20 minutes for the usual laboratory test.

Signal lights tell the operator whether or not the sample successfully passes the test, and the machine simultaneously controls a stamping mechanism which will stamp a shipping ticket only when an oil with a satisfactory flash point has been run. A complete system of interlocks is employed to make the machine inoperative in the event of failure of utilities or because of the failure of any essential component of the machine.

An experimental model of the machine has been in field service for some time and a number of commercial models have been in field service for the past year.

*Technical director, engineering research department, Standard Oil Co. (Ind.).

Method needed . . . The safe handling of petroleum products requires that flash points be checked a number of times during manufacturing and distribution. After a material with the satisfactory flash point is manufactured, there always remains the possibility that it may have its flash point lowered through contamination in storage or in pipe line or by truck transport.

To be sure that a product meets the required flash point specifications, it is customary to check the flash point a number of times. The automatic flash point tester was developed to check shipments in tank cars and transport trucks from our terminals.

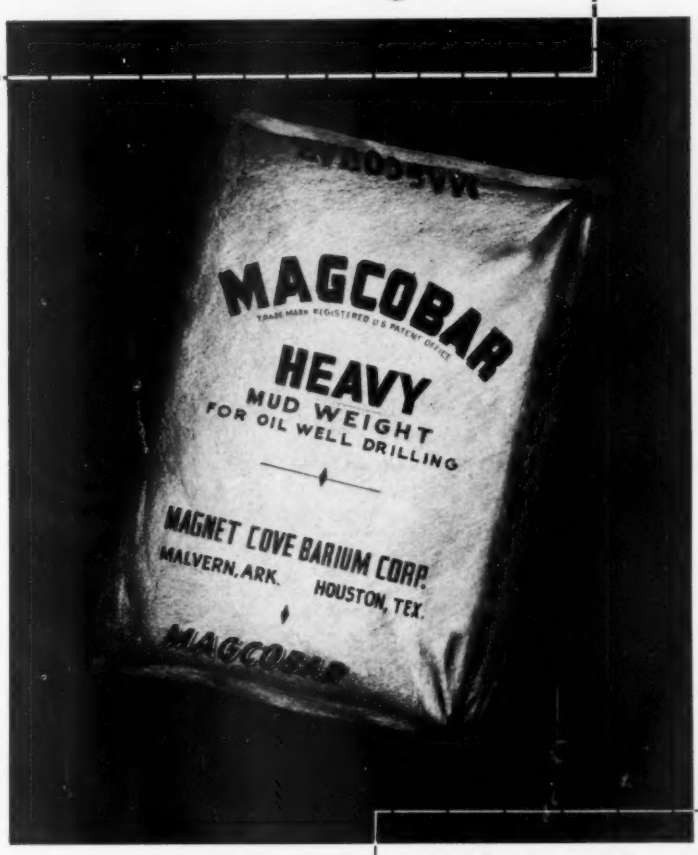
Instrument requirements . . . The main requirements governing the design of the instrument were the following:

1. That it be completely automatic.
2. That its operation be sufficiently simple and foolproof so that no training of operators would be necessary.
3. That it be constructed so that it could be used safely in a hazardous (gasoline vapor) location.
4. That a failure of power, air, or any essential instrument component would make the machine inoperative.

Principle of Operation

The principle of operation of the instrument is illustrated in Fig. 1. Oil is brought up to the desired temperature

It's In The Bag



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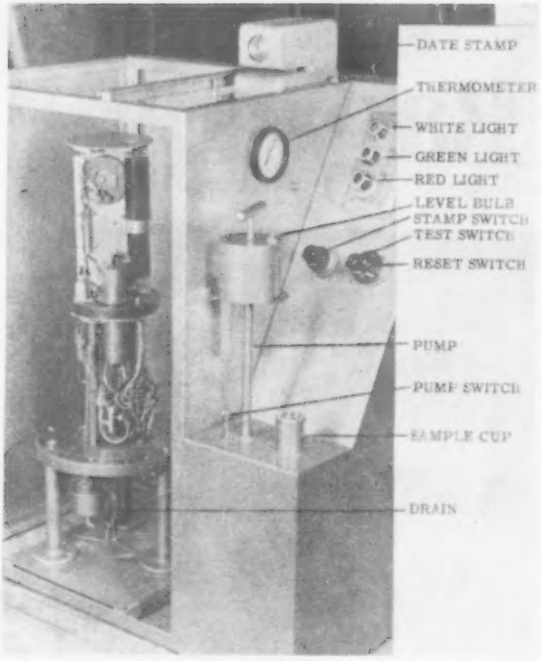


Fig. 4—Commercial instrument with cabinet panels and housing removed.

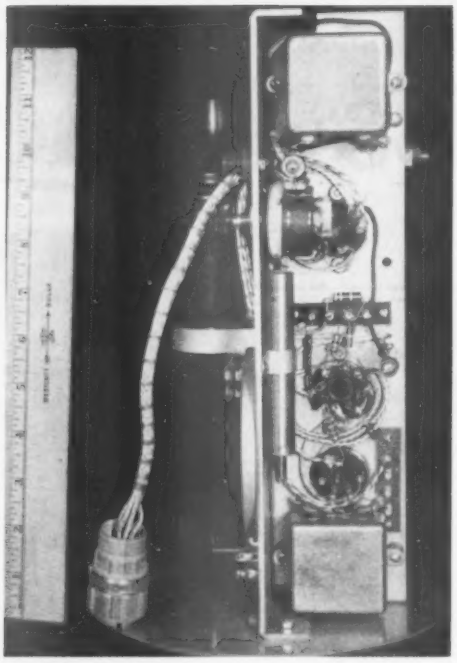


Fig. 5—Electrical assembly on commercial instrument.

by its passage through a thermostated metal block, the top of which is a flash "cup." The oil flows continuously for the duration of a test, and is mixed with air just before it reaches the cup area. An air-vapor mixture fills the cup and the excess oil is continuously drained off by gravity.

An intermittent electrical spark is provided to ignite the air-vapor mixture. If the mixture ignites (flashes), the pressure developed expands a bellows on top of the cup and trips a switch, which indicates that a flash has occurred.

The instrument operates in the following manner. (See Fig. 2). A gravity-operated piston is pulled up and locked in this position by turning its handle. The oil chamber is then filled with the sample (approximately 100 cc). After the sample has flowed into the pump barrel, the pump weight is released by pump handle and the oil then flows through the instrument under the pressure developed by the piston-weight combination.

The oil flows through a flow-regulating capillary tube and into the thermostated preheater block which brings the oil approximately to temperature. The oil continues its flow to the main thermostated block where it is mixed with air. An air-vapor mixture is formed in the cup and the excess oil flows out of the cup by gravity. The air-vapor mixture is subjected to the action of an intermittent electrical spark.

If the flash point of the oil sample is below the temperature of the thermostated block, a flash will take place, and the pressure developed by the flash expands the bellows and trips the bellows switch. This switch turns on a red light, indicating that the sample has a low flash point. If a sample is run which has a flash point higher than the temperature of the thermostated cup, no flashing will occur for the duration of the test, which ends when the pump reaches the bottom of its stroke.

When this happens, and providing that all other necessary conditions are satisfied, a green light will go on indicating that the sample has a satisfactory flash point. Simultaneously an electrical condenser is charged, which allows an IBM time clock to make a single stamping on a shipping ticket indicating the date, the time, and "satisfactory flash point." In the event of a low flash point sample, neither the "green light" nor the IBM stamp is operative.

System of interlocks . . . It is essential that a "green light" cannot be obtained unless a satisfactory test has been made. To achieve this end, a number of interlocks have been incorporated in the instrument making it impossible to obtain a "green light" in the event of a failure of an essential component or utility. It was recognized that a "green light" should be obtained only under the following conditions: namely, that the block temperature was correct, that the electrical spark was functioning properly, that an adequate sample had been loaded into the instrument and it was flowing properly through the instrument, and that there was adequate air flow.

The design is such that a failure of any one of these essential elements automatically cuts off power to the indicating and stamping circuits. The manner in which this is accomplished is described briefly as follows:

1. **Temperature.** The temperature of the thermostated block is monitored by a thermal switch so connected that if the temperature of this block is too low, the power to the indicating circuits is cut off. This interlock thus takes care of: (a) a power interruption, (b) a faulty thermostat, and (c) inadequate warm-up time after instrument power is turned on (power is normally on continuously).

2. **Spark.** To be certain that the electrical sparking mechanism is operating properly, an intergrating circuit has been provided so that it is impossible to obtain a green light unless a predetermined number (about 30) of sparks

have actually crossed the spark gap located in the flash cup.

3. **Oil.** To be certain that an adequate sample has been loaded into the instrument and that it is actually flowing through the instrument in the intended manner, several interlocks are provided. First of all, the release of the pump plunger initiates the test through action on a pressure operated switch located on the oil feed line. Again, if for instance the operator forgets to pour his sample and releases the pump, the rapid descent of the piston under these conditions compresses air into the flash chamber in such a manner as to expand the bellows and give a "red light." If the operator pours a sample which is too small, the pump will reach the end of its stroke before a requisite number of sparks have occurred to energize the integrating circuit mentioned under (2) above and no "green light" can be obtained.

4. **Air flow.** If the air supply should fail or if an air line should become clogged, a switching arrangement is provided to denergize the indicating and stamping circuits. The mechanism here consists of a differential pressure switch located between two capillary resistances (see Fig. 3).

5. **Miscellaneous.** While these interlocks take care of the likely contingents, it is recognized that no man-made device can be absolutely foolproof and the following additional precautions are a recommended part of the operating procedure.

A "test" button is provided. Pressing this button energizes the red light circuit and serves as a means for testing this circuit. It is a recommended practice that the test button be tried immediately before each flash sample is run. In this way not only is the red light circuit tested, but the operator knows before running the sample that the temperature and air flow are correct and that a fair test is possible.

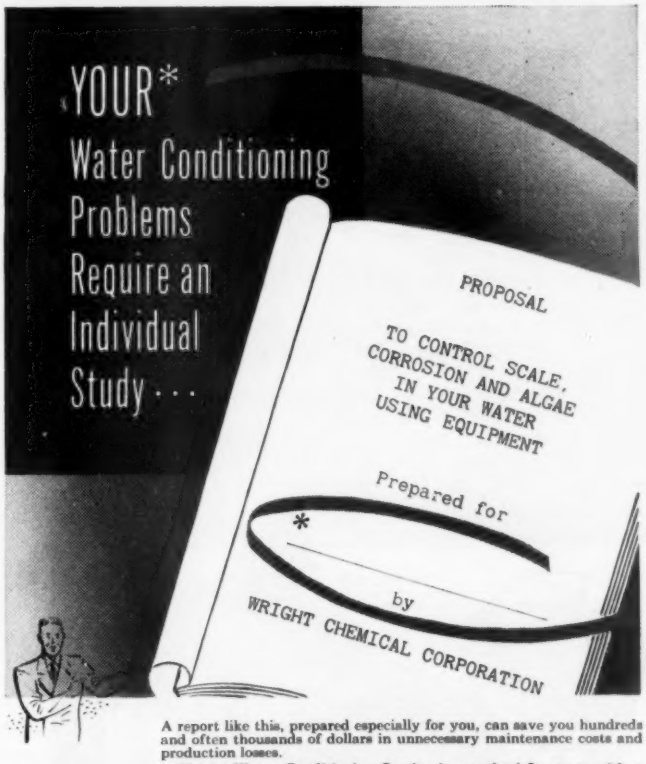
Another recommended procedure is that of running samples of oils of known flash points slightly above and below the instrument's reject temperature. Such samples are run once a day or more often as an over-all check on the instrument. All samples are kept on hand for possible recheck until a subsequent check of the instrument is made with these known test samples, at which time the routine samples can be discarded.

In this manner, all tests are bracketed between instrument checks with samples of known flash point. When this procedure is followed and because of the interlocks provided on the more important instrumental elements, flash points run on the instrument can be accepted with a high degree of confidence.

Construction and operation . . . The principal requirements governing the mechanical design of the instrument were (1) that the instrument be of explosionproof construction so that it might be operated safely in hazardous locations, (2) that convenience of operation be kept uppermost in mind in order that no special skill or training in its use be required, and (3) that it be a self-contained unit ready for operation when connected into a 110-volt, a.c. line.

Figs. 3, 4, and 5 show several views of the instrument. In Fig. 4, the principal working parts are shown with the explosionproof housing removed. Fig. 5 shows the removable chassis which contains all of the important electrical circuits. This chassis may be removed from the instrument and replaced by a spare in a matter of approximately 30 minutes. In this manner all important electrical servicing can be done in the shop rather than in the field.

In Fig. 3, the instrument is shown with the case intact, ready for use. It will be seen that there are a minimum of controls and meters to confuse the operator. He has at his control three switches, a pump handle, and a sample loading cup, and for his information three pilot lights. Although a dial ther-



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mometer is provided, the operator is not required to read this.

In making a test, the operator draws the pump to the top of its stroke and locks it in this position by turning the handle. He next pushes the button marked "test switch" and if everything is satisfactory, the red light goes on. He then presses the button marked "reset switch" and the red light goes off. He then pours a sample into the sample cup and when this has flowed into the pump barrel, he unlocks the pump by turning the handle. A white light then flashes once each second.

If the sample has a flash point higher than that for which the instrument is set, the white light continues to flash until the pump reaches the bottom of its stroke, at which time the green light goes on, indicating to the operator that the oil had a satisfactory flash point. The operator may then insert a shipping ticket into the time stamp, shown on top of the instrument, and stamp this ticket once by pressing the button marked "stamp switch."

This completes the test, which in this case requires approximately 2½ minutes. If, on the other hand, the oil has a flash point lower than that of the instrument setting, the red light will go on some time before the pump has completed its descent, signifying to the operator that this flash point was unsatisfactory and the test is concluded. This test requires about 1 minute.

The general specifications for the instrument are given in Table 1.

TABLE 1

Weight—600 lb.
Size—Height: 49 in. Base: 38⅛ in. by 23¾ in.
Power required—110 volt, 60 cycle, single phase 1,250 watts maximum.
Sample size—100 cc.
Flash point range—105° F.-160° F.
Time required for test—(1) minute-(2½) minutes.
Air—Supplied by self-contained compressor and storage tank.
Accuracy—See below.

Instrument accuracy . . . Bi-metallic thermostats are used in the instrument because of their ruggedness and simplicity. While these thermostats have a small differential (±0.1° F.), they are sometimes subject to drift over a period of time. Accordingly, the accuracy of the instrument is limited by these thermostats. As a matter of being practical, it is our practice to regard the instrument as accurate to ±1° F. to allow for the drift which apparently is inherent in bi-metallic thermostats and at the same time to place no unusual burden upon the maintenance crew. Under these conditions, readjustment of the thermostat about once every 2 months is required on the average. The necessity to readjust makes itself manifest on the dial thermometer, which indicates the temperature of the block, and also by the behavior of the instrument on the test oils.

The instrument is, under normal circumstances, self flushing. By this it is meant that as long as the oils tested have satisfactory flash points, the instrument is ready for a new test without flushing. This, of course, covers the vast majority of the cases, because only rarely does an oil test unsatisfactorily. In this case, it is a recommended practice that a sample of oil known to have a high flash point be run through the instrument before any other unknown samples be run.

If a bad mistake is made and a highly volatile material, such as gasoline, should be run through the instrument, no permanent damage to the instrument will result, but several flushings of the oil of known high flash point will be required before the instrument will be usable again. In the last two cases cited, it will be noted that the instrument will fail "safe" in the sense that it can indicate a satisfactory oil as unsatisfactory but not vice versa.

The automatic flash-point instrument has been licensed by Standard Oil Co. (Ind.) for sale under its patent rights. Precision Scientific Co., Chicago, is licensee.

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Drill-Pipe Rejects Show Good Service Life

(Continued from page 102)

ing salt-string holes, it drilled 8¾-in. holes below the surface casing for setting the production string, mostly 7-in. o.d. casing.

Drilling history . . . Approximately 3,800 ft. of hole was made in each of the seven wells or an actual total for the string of 25,192 ft., at which time it was discarded. Since the Stanolind string drilled only the very much harder, lower formations, as compared with the softer, upper formations penetrated by the Thompson-Carr string, in the same general area, there can be no comparison whatsoever as to the relative service of the two strings. Had Stanolind kept a record of rotating hours, as did Thompson-Carr, it is probable that the strings would have shown approximately equal service.

As the wells were deeper (up to ±8,600 ft.) than the length of the defective pipe (5,800 ft.), the string was completed at the top with other drill pipe. The experimental pipe was run on the bottom, where the service is most severe. However, as stated before, adequate drill-collar weight was maintained and the drill pipe was intended to be in tension at all times.

Failure causes . . . During the drilling of the seven wells there were 17 failures, but 3 were tool-joint breaks. Of the 14 pipe failures there were 3, properly recorded as to tube numbers, which were mislaid before being sent back to the mill for study.

Of the 14 there were 9 Grade D failures and 4 Grade E and 1 unknown (lost). Since there were originally 64 Grade D tubes and 136 Grade E, it would seem that Grade E is better suited for this type of drilling. However, the writer is not at all convinced that this is proved since other factors, such as the treatments of the inside surface, exert much more influence than grade of steel.

Probably of much greater significance is the fact that there were no failures in plastic-coated tubes. Of the 14 pipe failures there were 6 in untreated (scaled) inside surface tubes, 7 in the shot-blasted and shot-peened tubes, and 1 unknown. Actually it was quite disappointing that these field trials did not reveal very much as to the effect of inside surface treatment.

It is assumed that this is because the corrosion factor was at a minimum in both the Thompson-Carr and the Stanolind strings. There were only 3 definite cases of corrosion fatigue failures in the total of 19 returned samples from both strings. By contrast, in the original Thompson-Carr experiment there were 21 corrosion fatigue failures out of 21 total failures.

First failure . . . The first pipe failure in the Stanolind string occurred in the very first well, one in Three Bar field, Fig. 8. A transverse crack, apparently the result of pure fatigue, at the upset runout traveled halfway around the tube. This was length No. 81, Grade D, shot-blasted and shot-peened, with a heavy inside seam 4 ft. 1 in. long extending through the box-end upset.

The seam can be seen in the photograph and it will be noted that the center of the crack is exactly 180° from the defect. Therefore it could not have been responsible for the failure.

There were no failures in the second well, but there were two in the third one, in Andector-Ellenburger field. The first one, Fig. 9, is in tube No. 58, Grade D, not treated (with original mill scale on inside). Its defect was an inside seam 16 in. long through the pin-end upset, whereas the failure occurred 2 ft. from the pin end. This

(Continued on page 139)

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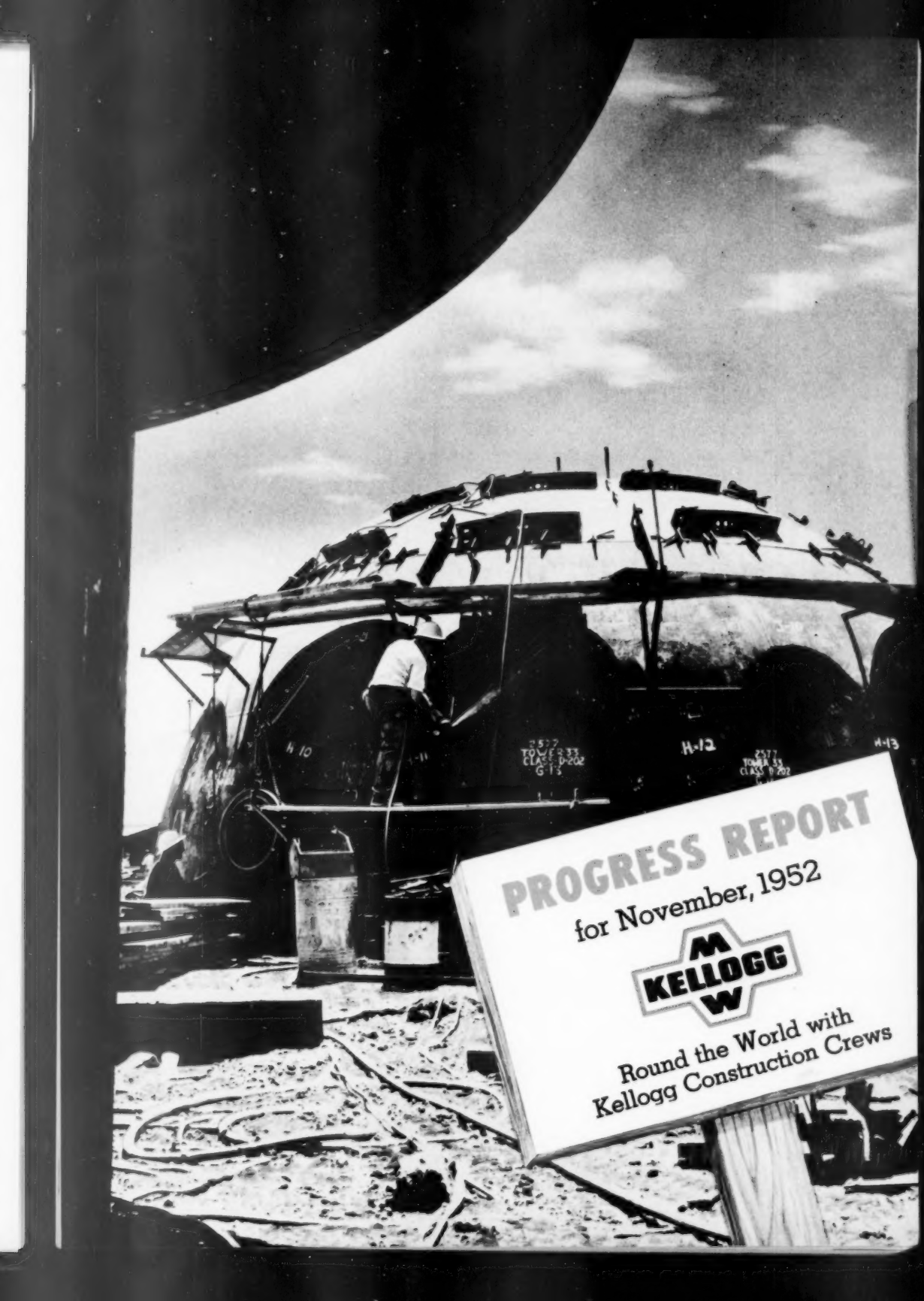

PROGRESS REPORT
for November, 1952
M
KELLOGG
W
Round the World with
Kellogg Construction Crews

PROGRESS REPORT for November

First pictures of gasoline-from-coal synthesis plant in South Africa reveal considerable foundation work and structural steel already in place. The $50 million plant embodying Kellogg's Synthol process is the first commercial unit of its kind.

In the Southwest another important modernization program is beginning to take shape. Among the major units to be installed is an Orthoflow Fluid catalytic cracker. Here a crawler crane is employed in the erection of a pedestal for a guy derrick.

On the Gulf Coast, two three-stage pipe stills are well underway with completion scheduled for 1953. The units each comprise pre-fractionator, topping and vacuum towers. Main fractionator of one 60,000-BPD unit is shown in left foreground.

ROUND THE WORLD WITH KELLOGG CONSTRUCTION CREWS

1952...continued...

(PHOTOS SHOW ACTUAL FIELD CONDITIONS AS OF OCTOBER 1, 1952)

Rated at approximately 63,000-BPD reactor throughput, a huge Fluid catalytic cracker is being erected in Philadelphia. This view shows recovery and underground water lines. Inset picture reveals progress on structural steel for main fractionator and catalyst storage drums.

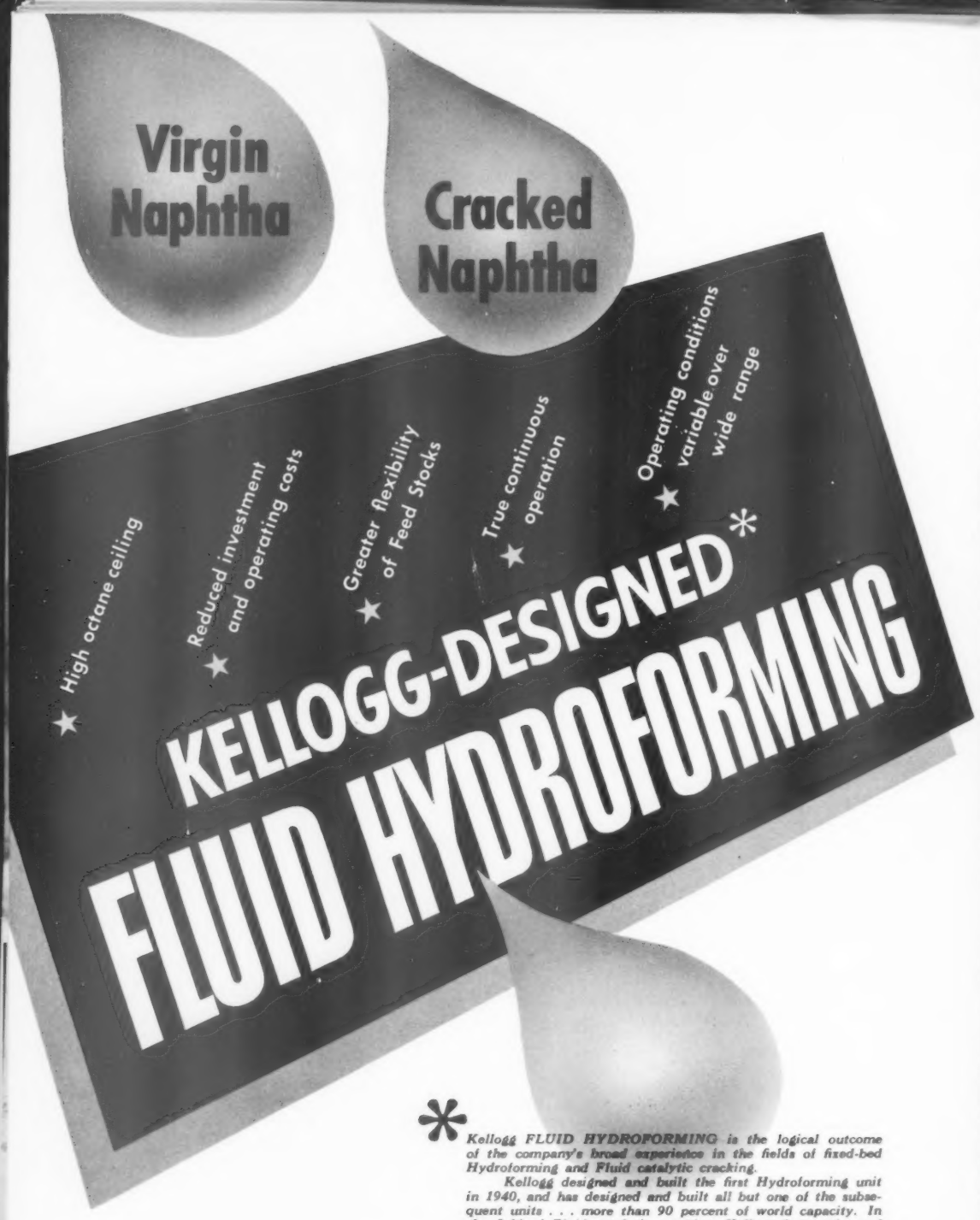
In Argentina, a complete 28,300-BPD refinery is moving steadily along. Furnace stacks to the rear of the vertical furnace belong to the main crude furnaces. In the background, may be seen the outlines of a Fluid catalytic cracker.

One of nearly a score of chemical projects is in the pile driving stage on the West Coast. Pre-cast cement piles are being driven down to bed rock for this ammonia plant. One of its features will be Kellogg-designed reactors.

PROGRESS REPORT
CONTINUED ON THIRD
FOLLOWING PAGE . . .

IMPORTANT!
See next page for message
about FLUID HYDROFORMING
M. W. KELLOGG

ROUND THE WORLD WITH KELLOGG CONSTRUCTION CREWS



* *Kellogg* ***FLUID HYDROFORMING*** *is the logical outcome of the company's broad experience in the fields of fixed-bed Hydroforming and Fluid catalytic cracking.*

Kellogg designed and built the first Hydroforming unit in 1940, and has designed and built all but one of the subsequent units . . . more than 90 percent of world capacity. In the field of Fluid catalytic cracking, Kellogg has engineered an annual capacity of better than 350 million barrels.

Comprehensive data on Fluid Hydroforming for both naphtha upgrading and aromatics production—from the company's own pilot plants and from all other authoritative sources—is available to Kellogg customers.

First to go on stream . . . will be this Fluid Hydroformer for a Gulf Coast refiner. It is scheduled for completion this month. Two others are now being engineered by Kellogg—one to be located in Louisiana and the other for the Mid West.

Each brings the advantages of efficient fluid catalyst techniques to the upgrading of naphthas . . . each is engineered to provide great flexibility in choice of operating conditions.

Catalyst level in the reactor can be varied over wide limits. The turbulent catalyst bed serves to improve catalyst-feed contact, and also functions as an important aid in temperature control. Steady, uninterrupted production of desired quality may be maintained continuously on any given feed stock, since fresh catalyst is introduced as necessary to maintain desired catalyst activity and selectivity.

Fluid Hydroforming provides higher octanes from low quality naphthas. And since it is a continuous, regenerative process, it is adjustable to a variety of feed stocks from hexanes (for benzene production) to kerosene, including virgin heavy naphthas, high-sulphur cracked naphthas and mixed virgin-and-cracked feed.

Fluid Hydroforming is not only more economical in operation but also requires a lower initial investment than comparable fixed-bed equipment. If you are considering expansion or renewal of naphtha processing facilities, a study of Fluid Hydroforming advantages will be rewarding.

Actual commercial operating data from this first plant will soon be available. But meanwhile, a Kellogg bulletin, "FLUID HYDROFORMING", gives detailed pilot plant data on performance of the process in handling virgin, coker and mixed naphthas from several different crudes. Copy will be mailed on request.

THE M. W. KELLOGG COMPANY

for fifty one years an integral part of petroleum refining progress!

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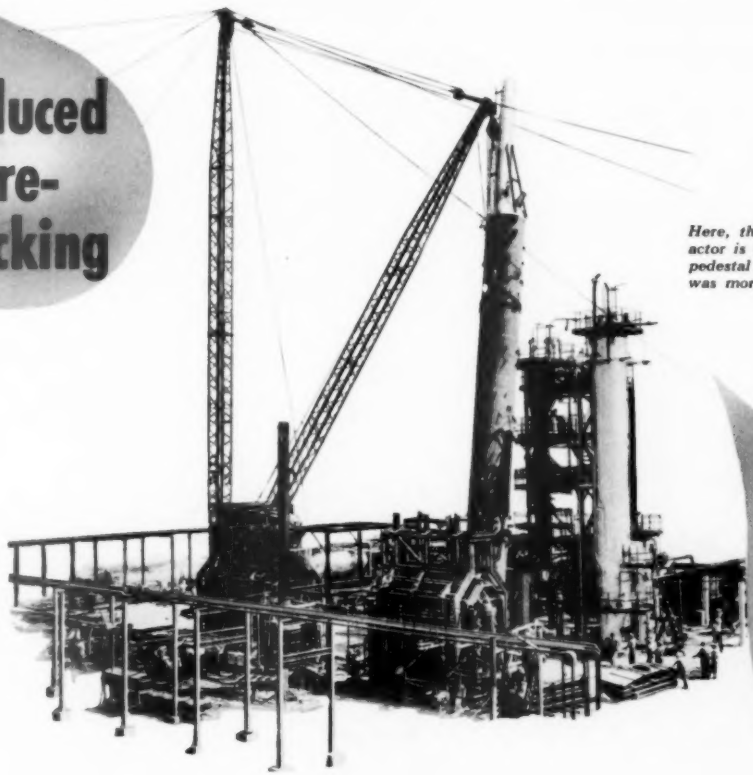
Reduced Pre-Cracking



Here, the Kellogg-designed reactor is lifted onto its concrete pedestal at a time when the unit was more than 80% complete.

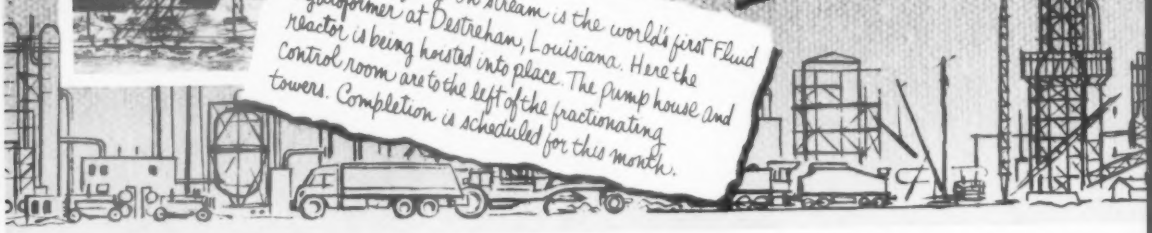
High Octane Ceiling

NEW YORK JERSEY CITY LOS ANGELES TULSA HOUSTON TORONTO LONDON PARIS

PROGRESS REPORT for November,

Almost ready to go on stream is the world's first Fluid Hydroformer at Destrehan, Louisiana. Here the reactor is being hoisted into place. The pump house and control room are to the left of the fractionating towers. Completion is scheduled for this month.

In Ohio, the pedestal for a large Orthoflow Fluid catalytic cracker has been poured. The job includes considerable other new equipment as well as modification of existing units.



ROUND THE WORLD WITH KELLOGG CONSTRUCTION CREWS

1952...continued...

(PHOTOS SHOW ACTUAL FIELD CONDITIONS AS OF OCTOBER 1, 1952)

The excellent progress being made on this job in Canada is readily apparent. The inset shows the site in May. The main units, both the largest of their kind in the Dominion, are Fluid cracking and combination atmospheric and Vacuum distillation

The British Isles are the scene of major activity in the erection of Kellogg-designed units. One of several different projects, this 17,500 vacuum flasher is now being finished in Scotland. The main furnace is shown to the right while in the foreground is the water cooler.

Shielded against the raw Wales' winds, welders continue work on the regenerator of a 10,000-BPD Fluid cracker for a British refiner. In other parts of the Isles, construction crews are erecting two additional catalytic crackers as well as other refining and chemical plants.

PROGRESS REPORT CONCLUDED ON NEXT PAGE

M. W. KELLOGG

ROUND THE WORLD WITH KELLOGG CONSTRUCTION CREWS

PROGRESS REPORT for November, 1952

KELLOGG

In Illinois, most of the foundations are in place and steel work is going up for an iso-octyl alcohol plant. The new unit will produce 10 million pounds annually.

This site was barely cleared in May. Now the world's first Phenol-from-Cumene plant is beginning to assume its finished appearance. The slender towers to the right are for purifying end products—phenol, acetone and methyl styrene

In Italy, a thermal reformer (above) was just completed at press time. To improve the overall octane rating of the gasoline pool a catalytic polymerization unit is also under construction. Its partially-bricked control house is on the left. (see below)

OTHER MAJOR CONSTRUCTION PROJECTS IN WORK

Alkylation Plant — *U.S. East Coast*
Cat Poly Unit — *Scotland*
Complete Refineries — *One for Chile; one for Iraq; two for Brazil*
Deasphalting Units — *two, U.S. Southwest, England*
Decarbonizing Unit — *U.S. Southwest*
Desalting Unit — *U.S. East Coast*
Fat Splitting Unit — *Norway*
Fluid Hydroforming Units — *two, U.S. Gulf Coast, Midwest*
Olefin and Petrochemicals Plant — *Italy*
Orthoflow Crackers — *two, U.S. East Coast, Canada*
Phenol-from-Cumene Plant — *U.S. East Coast*
Phenol Treating Unit — *U.S. Southwest*
Phthalic Anhydride Plants — *two, England, Italy*
Solexol Decolorizing and Fractionating Unit — *Norway*

A KELLOGGRAM HAS JUST BEEN ISSUED WHICH FEATURES KELLOGG CONSTRUCTION OPERATIONS—IF YOU HAVEN'T RECEIVED YOUR COPY JUST DROP A LINE TO 225 BROADWAY, NEW YORK

ROUND THE WORLD WITH KELLOGG CONSTRUCTION CREWS

fact plus evidence that the crack originated on the outside makes it very evident that the defect had no connection with the failure. It probably should be classified under pure fatigue.

The other failure in the third well, Fig. 10, is a burst and is therefore an unusual type of drill-pipe failure. It occurred at 2,000 psi. mud pressure while trying to burst a circulating sub. The length, No. 54, had been shipped with one of the very bad inside seams.

The depth of the seam at point of failure was approximately 0.200 in. or 60 per cent of the nominal pipe wall thickness (0.337 in.). Why this tube could withstand the special mill test of 5,000 psi. and then fail in the field at some 2,000 psi. is hard to understand. Possibly there was some sort of pressure surge, as happens in pipe lines, which built up an unusually high pressure momentarily, and which was too brief to be noted on the gage. Anyway, this must be chalked up as a failure in a mill defect even though it did not occur under normal rotating conditions.

Transverse-scar failure . . . An interesting failure which did not originate in a mill defect is shown in Fig. 11. This was tube No. 93, Grade D, having a deep, intermittent, inside seam the entire length. It failed in the fourth well, in Three Bar field.

This failure very evidently started in transverse scars at the face nearest the camera and progressed circumferentially around the tube. When it tore into the seam, at the far side in the photograph, the final separation was no doubt affected by the seam, but was not caused by it. The measured depth of the defect at point of failure was 0.061 in. or almost 50 per cent beyond the A.P.I. allowable depth figure of 0.042 in.

The tenth pipe failure in the Stanolind string is illustrated in Fig. 12. It would seem, at first glance, that the failure occurred in a mill defect, but there is room for doubt.

The inspection department report on this tube (No. 70), before shipment, reads: "Inside Seam—Light—Intermittent Seam Entire Length." This seam is not present in the half tube in the photograph, but there is a very shallow defect known as a "sliver" near the washed-out crack and some visible roughness underneath it. Also, on the outside there are slip marks, the failure having occurred 3 ft. from the box end or exactly in the area where drill pipe is repeatedly caught by the spider slips.

Since slip marks are a very common cause of notch fatigue failures, it is very likely that this washed-out crack actually started from the outside of the tube and not from an inside defect. Even giving it the benefit of the doubt, this is only the second failure in a mill defect in the Stanolind string.

Seam failure . . . A very definite case of failure resulting from a mill defect occurred in the seventh or last well, just before discarding the string. The length of service almost equaled the total useful life of the string. This happened to be a Grade D, untreated, length.

The defect was another of the "very bad" inside seams, heretofore described, running the whole length of the tube. The curled-up outer edge of the seam (overlap) had corroded to paper thinness and then developed numerous transverse cracks. Two of these, one near the top and one near the bottom of the photograph, finally penetrated entirely through the wall, both at about the same time.

Incidentally, this was one of the final three failures, in the last well, all of which showed "fatigue, two places," and which led to retiring the string. The other two pipe failures, which were double fractures, were entirely unassociated with mill defects. Both were

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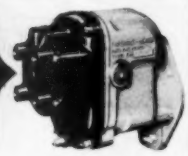

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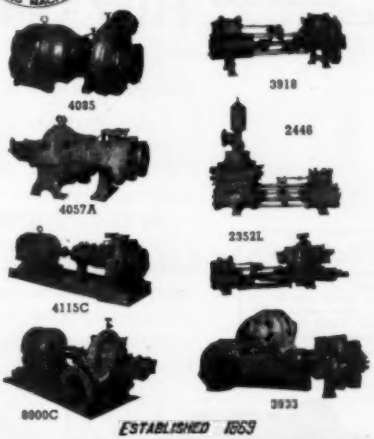

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definitely the result of corrosion fatigue. Both happened to be Grade E, one being shot-blasted and shot-peened and the other untreated (with original mill scale on the inside).

Summary

The data from both the Thompson-Carr and the Stanolind strings have been combined into the following table:

Type of defect—	No. of lengths
Inside seams	216
Outside seams	37
Inside pits	2
Outside pits	28
No defects (added to complete string)	1
Total	284

During the life of the two strings the following pipe failures developed:

Pure fatigue (no notches or corrosion discernible)	4
Notch fatigue (in slip marks)	4
Notch fatigue (origin of scars unknown)	3
Corrosion fatigue	3
Failures not picked up for study	9
Failures directly associated with mill defects	4
Failures seemingly associated with mill defects	1
Total	28

Assuming, then, that the last five failures listed above definitely were caused by mill defects, the percentage is about 1.8 per cent of the total under test. This is surprisingly small in view of the fact that all but one of the 284 tubes involved had been rejected by the mill inspectors and were destined for the scrap shears.

Conclusions

Steps taken to delay corrosion fatigue were so effective that out of a total of 28 failures there were only 3 definite cases of corrosion fatigue.

Therefore, it can now be said more positively than ever before that the ordinary types of mill defects—seams, pits, scores, etc. (inside or outside), well beyond the A.P.I. allowable—are negligible factors in causing drill-pipe failures. The four cases cited, in which the defects definitely resulted in failures, were quite extraordinary.

Previous Studies

An A.P.I. paper entitled "Field Test on Rejected Drill Pipe," presented by A. W. Thompson, of Thompson-Carr, Inc., and the writer in 1948, discussed a test made to learn whether the usual types of mill defects had any appreciable effect on the service life of drill pipe. The test was conducted with 183 lengths (5,300 ft.) of 4½-in. o.d. untreated pipe, all of which had been rejected at a pipe mill for various defects, principally outside and inside seams and pits.

All of the defects were of a nature heretofore considered as making the pipe utterly unfit for field service.

The experiments were conducted by Thompson-Carr, Inc., in West Texas fields where corrosive salt-water conditions greatly aggravated the frequency of drill-pipe failures. In fact, they were once so frequent that contractors felt very certain the pipe must in some way be at fault. The test string was used to drill 20 salt-string holes 11 and 12½ in. to an average depth of 2,323 ft., during which 21 failures occurred. They were either complete fractures resulting in fishing jobs, or washed-out cracks which were caught before they parted.

Examination of each failure showed that not one had occurred in a mill defect. All of them resulted from corrosion fatigue. Thus, it seemed fairly well established that the ordinary, visible types of mill defects had no appreciable effect on the incidence of field failures. It was concluded, however, that there was of course some limit as to the depth or shape or direction of mill defects beyond which could be acceptable.

Reference

A. W. Thompson and H. G. Texter, "Field Test on Rejected Drill Pipe," Drilling and Production Practice, 87 (1948).

REDESIGNING YOUR PRODUCT?

Bettmann Archives*

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*This wire drawing plant in 1828 was operated by hand. The need for more wire and better wire led to the development of today's highly developed, automatic machinery.

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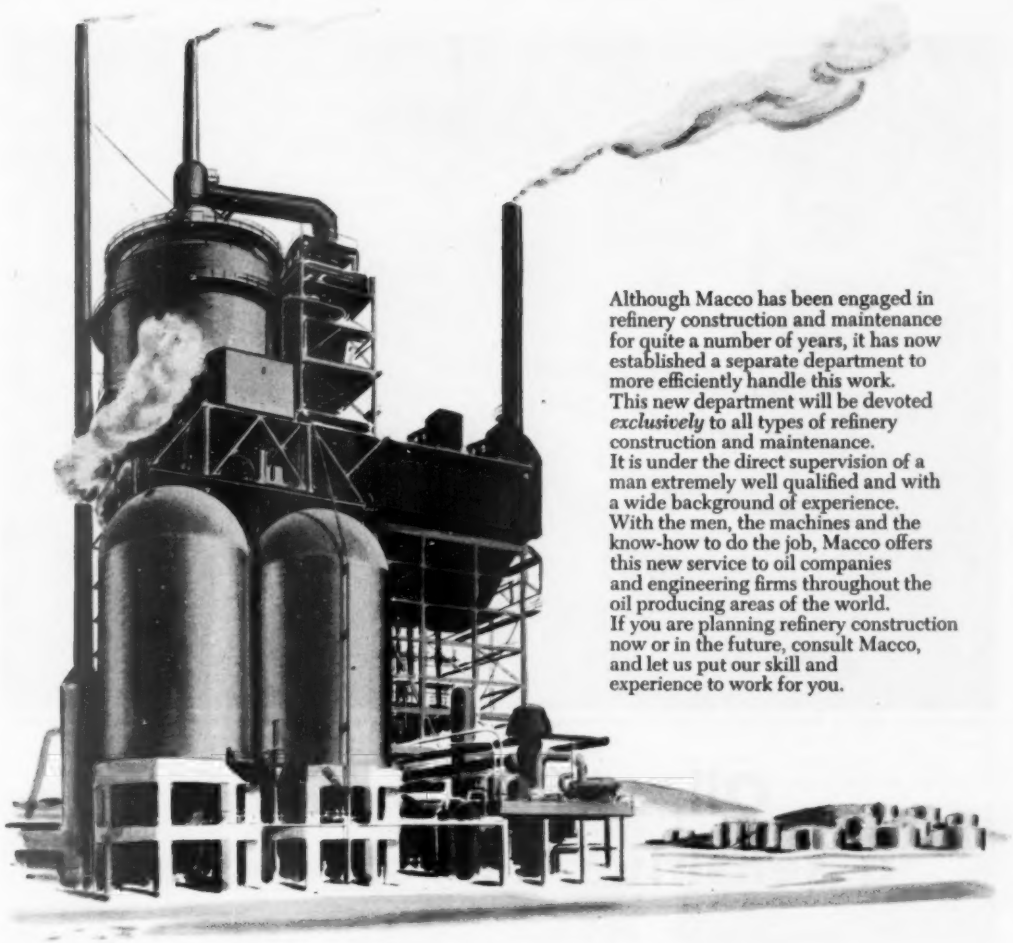

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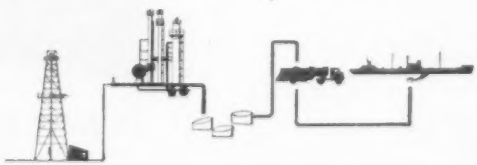

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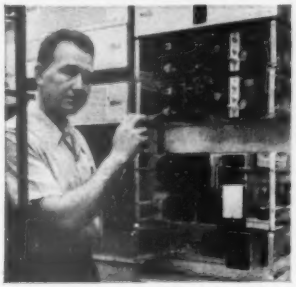
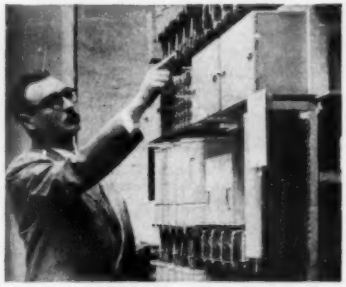


George Robertson, Maintenance Engineer, with Lenkurt Carrier equipment which permits each pair of wires to carry several calls simultaneously.



Fred Broughton, Union Oil's Communications Engineer responsible for planning the P-A-X Telephone System with the General Office switching equipment.

Control room of Union's large modern refinery at Wilmington. Operators receive P-A-X telephoned instructions to adjust the controls. P-A-X telephones give the Pump House Dispatcher precise control of oil flow.

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Union Oil Company coordinates widespread operations with its own telephone system

Union Oil Company of California—largest and oldest "independent" in the West—has 2,000 wells pumping from 600,000,000 barrels of reserves. Union's 1,200 miles of pipe lines transport 70,000,000 barrels annually and its fleet of seven oil tankers transports oil and derived products regularly to South America, Hawaii, Alaska, and ports in other far-flung places.

Distance and dispersal—coupled with the necessity for split-second coordination—created difficult communication problems. Union Oil solved these problems with uninterrupted "private-wire" P-A-X telephone communications, engineered to allow for unlimited expansion. Today, the company saves dollars and time and resolves formidable problems of distance with its own telephone system. Since its new telephone system was "cut in", Union Oil personnel make more than 11,000 calls each day.

Several different types of circuits are used by Union Oil to complete their trunk line system. These include wire, phantom and carrier circuits. Through use of carrier equipment, a single pair of telephone wires carry a number of

Reporting work progress on Field Dispatcher's telephone.

telephone calls simultaneously—an easy way to expand a telephone system without large investment in physical lines or use of critical materials. The carrier equipment is Lenkurt Carrier, engineered and installed by Automatic Electric as an integral part of the over-all communications system.

The P-A-X network provides a complete communications "package" that controls every operation from the pumping of crude oil to final distribution of refinery products. This system is company-owned, -operated-and-maintained. Management has complete freedom in adapting its own telephone network to the ever-changing, greatly increasing demands of its extensive and complex oil operations.

Operator takes inventory of product quantities in various tanks throughout the terminal. Brown Electronik indicator to left is integral part of Shand & Jurs automatic gaging system and supplies both level indications and product temperatures in various tanks.

View inside floating-roof-type tank, showing line from float to idler and pulley and level transmitter.

Automatic Tank Gaging Facilitates Terminal Operations

Installation at Esso's Wilmington, N. C., terminal cuts time, labor

by C. C. Roberts*

THE new Esso Standard Oil Co. terminal at Wilmington, N. C., was designed not only to increase storage facilities for company products but to provide modern, last-word storage economies as well. Over-all, it is part of an expansion program to increase company terminal capacity by 8.5 million gallons of various products, including gasoline and domestic heating oil.

The new plant, one of the largest storage units on the eastern seaboard, is located on Cape Fear River. The site permits a first-economy advantage by the fact that tankers can unload quickly and easily at a long pier that connects the unloading facilities with the storage tanks.

Of great importance is the fact the terminal provides a partial solution to constantly developing supply problems in the oil industry. Two distinct trends have accentuated the additional need for ample storage facilities. These are: first, continually increasing demands for home heating oil; and, second, the change in the demand curve for gasoline resulting from year-round usage of automobiles. These trends have eliminated the wide seasonal demand fluctuations of the past and have, in combination with the general rise in the need for all oil products, posed a major supply problem for the industry. As a result, Esso launched its expansion program.

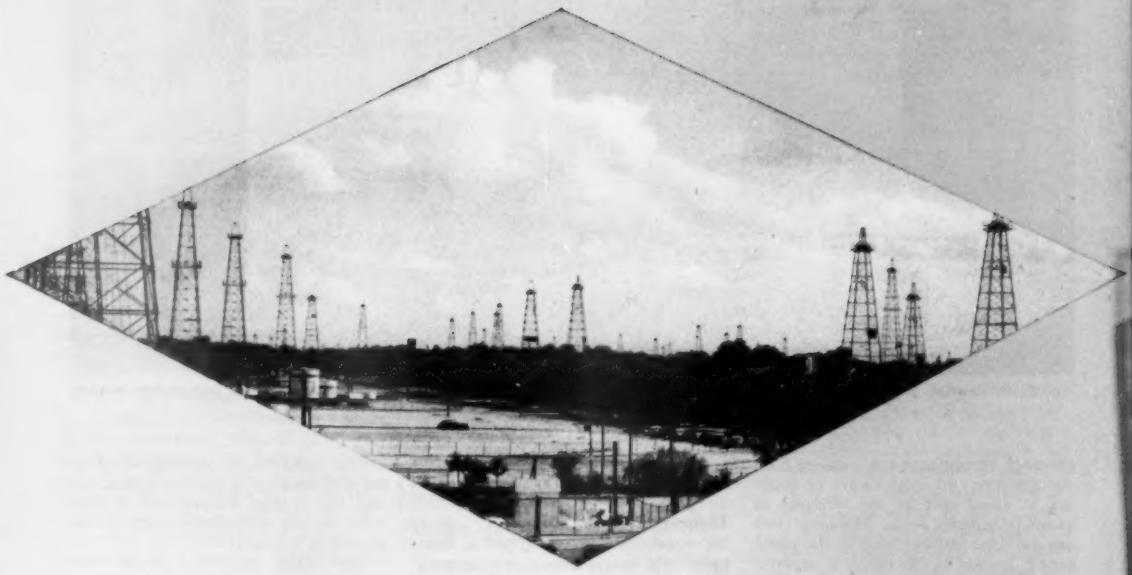
Improvements in terminal operating methods parallel the expansion of storage facilities. A prime example is the new method being tried out at Wilmington for gaging individual storage tanks from a central point. The present distribution setup calls for a daily inventory of various products. This inventory is sent to a central distributing office which schedules shipment (by tanker) of the products whose inventories show a sufficiently low quantity.

Rapid inventory . . . When former methods were used, a daily inventory required manual gaging of each storage tank at a terminal. This necessitated at least a trip to each tank to read a float gage at the tank. Occasionally, climbing some 80-odd steps to the top of each tank and dropping a tape and bob inside each was required. The measuring device was then drawn up and the tank level indicated on the tape (indication is in form of "high water mark") was logged. This process was repeated until each of the many storage tanks had been inventoried.

At the Wilmington terminal, manual gaging consumed a good hour of a man's time plus the expenditure of considerable physical effort. Moreover, the descent into floating-roof-type tanks for purposes of gaging sometimes presents a hazard due to the presence of noxious vapors on still days, although this risk is slight with modern equipment.

With the centralized automatic gaging system presently in use at the

*Industry engineer, Industrial Division, Minneapolis-Honeywell Regulator Co.



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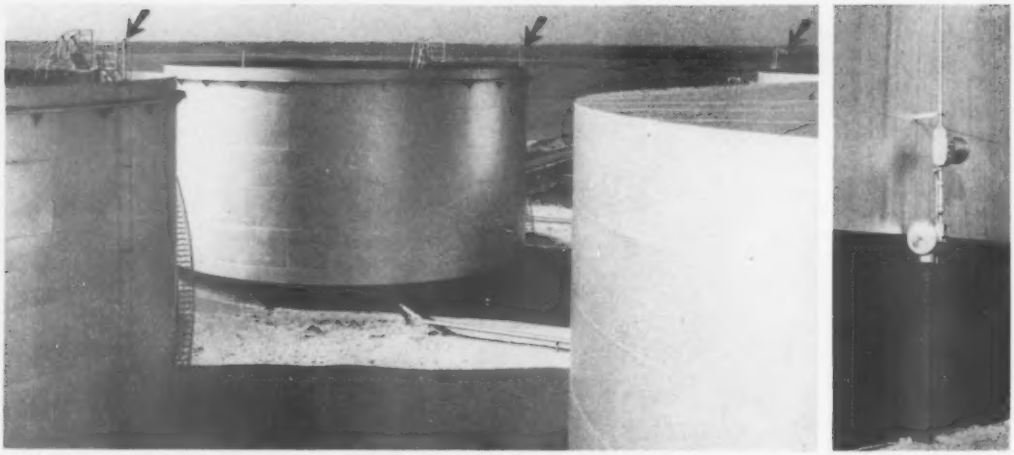


At left, floating-roof gasoline tanks. Note tank-gaging equipment. At right, tank-gaging equipment. Bottom unit is gage-reading housing; upper unit houses precision transmitting potentiometers.

terminal, an operator can measure both the quantity and temperature of product in every tank in the terminal in about 10 minutes or so. Moreover, this can be done without leaving the panel board, located in the terminal superintendent's office.

Operation of the system is relatively simple. The operator need only push a series of toggle switches in proper sequence to obtain product temperature and level for each storage tank.

Switches are arranged according to a tank numbering system. Three switches are allotted to each tank. These correspond to three instrument scales, namely, feet, inches, and temperature. Actuation of the switches connects the appropriate instrument scale to a corresponding sensing unit on some individual tank. As shown in photo, the operator logs the readings from the recording instrument, to the left on the panel board. Note that a switch is provided in the lower righthand corner of this instrument for switching it from temperature to level indications.

When taking the readings for an individual tank, the operator first switches the selector switch on the indicating instrument to the level position. By selecting the switch number corresponding to the tank he is gaging, he deflects the toggle switch on the Multiple selector-switch panelboard to the right. This is the "feet" position and the instrument indicates on the "feet" scale the depth of the product in feet for that tank.

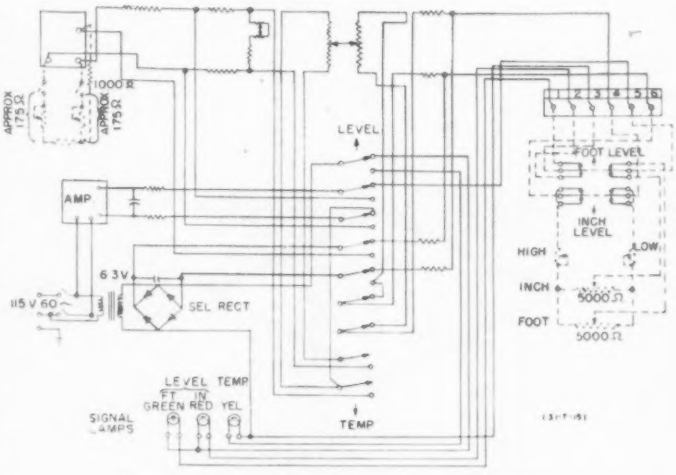
The operator next deflects the switch to the left and the instrument indicates on the "inch" scale the number of inches above the nearest foot mark corresponding to the actual tank level. Thus, the product level in the tank is given accurately in feet plus inches and eighths of an inch of actual depth.

Temperature measurement . . . Since the standard inventory gallon is based upon level measurements at a temperature of 60° F., a correction factor must be applied to compensate for the effects of ambient temperature changes. This is accomplished by measuring the product temperature in the tank at the same time that the tank level is gaged.

When using the centralized gaging system the operator turns the instrument selector switch to the temp position after logging the tank level. He then deflects a toggle switch on the temperature switch panel board (hidden behind operator in illustration showing central panelboard) corresponding to the tank number he has just gaged, and logs the product temperature as indicated on the temperature scale of the electronic instrument.

The three instrument scales are, respectively: 0 to 50 ft.; 0 to 12 in., and —40° to 160° F. Three signal lights, shown to the left of the instrument scale, indicate the scale in use. Toggle switches for tank-level indications, as noted, are arranged in two vertical rows on opposite sides of the multiple-switch panel board.

Switches are consecutively numbered for Tank 1, Tank 2 and so on. Wiring is such that deflection of each toggle switch to the right provides the level in feet; deflection to the left indicates



Schematic diagram of Shand & Jurs tank-level gaging system.

the excess in inches. Toggle switches for product temperatures in the various tanks are also arranged in dual vertical rows. One row comprises odd-numbered, the other even-numbered tanks, for purposes of ready and easy selection of the proper tank temperature switch number.

Null balance principle . . . The tank-gaging system employs a simple d.c. bridge circuit comprising transmitting potentiometers of the precision type, connected to an electronic null balance-type potentiometer, shown in Fig. 1. Use of this circuit is especially advantageous because at the balance point no current flows through the sliding contacts of the precision transmitting potentiometers. As a result, varying resistances at these contacts and possible erroneous level indications are avoided.

In each tank-gaging circuit, there are two transmitting potentiometers which can be alternately switched into the circuit. These are the foot and inch potentiometers. The inch potentiometer completes one revolution for each foot of liquid-level change and the position of its moving contact is converted to inches by the calibrated scale of the electronic indicator instrument. The foot potentiometer traverses zero to maximum resistance coincident with a rise in the float position of 50 ft. The position of its moving contact is converted to feet by the calibrated foot scale of the indicator.

The tank transmitter assembly comprises an explosion proof housing inside of which are the two transmitting potentiometers and the driving arrangement. The drive consists of a 12-in.-circumference sprocket wheel driven by precision perforations in a stainless-steel graduated tape which moves in accordance with a float that rides the liquid level in the tank. (The graduated tape may also be read at the gage housing of each tank.)

In operation, changes in float position, resulting from changes in liquid level in the tank, are transmitted by the stainless-steel-tape drive to the sprocket wheel of the transmitter unit. Rotation of the sprocket wheel alters the position of the inch and foot potentiometer contacts. When the instrument is switched to the potentiometer, thereby completing the bridge circuit, the instrument serve system balances the bridge by driving the balancing slide wire to the null position. This position is indicative of the level in the tank and is indicated as such by the calibration of the instrument scale.

Product temperature . . . Measurement of the product temperature in each tank is accomplished with resistance thermometers. The resistance thermometer bulb is installed as shown in the accompanying illustration. Resistance thermometers were selected as a temperature-sensing means because of the fact that they require no standardization, as do thermocouples. With resistance thermometers, all that is required for temperature measurement is balancing of the resistance bridge circuit.

Since the tank-gaging system also employs a bridge circuit, the same Electronik instrument can be used for both level and temperature measurements. The only instrument change necessary is to alter the fixed resistance constants in the bridge legs incorporated in the instrument, and to provide a properly calibrated temperature scale on the instrument. The net result is an instrument which can be switched from function to function and from measuring circuit to measuring circuit, thereby reducing all tank measurements to the manipulation of switches from a single position.

New Unit Really Cleans Tube Bundles

(Continued from page 112)

useful life of the secondary-stage cleaners.

After washing down, the bundle is replaced in the cleaner and secondary solvent is charged until the vessel is more than half full. Steam is turned on the jackets and rotation of the bundle is resumed. During this cleaning stage the condenser is used as a knockback unit, with all condensate being returned directly to the cleaning vessel by gravity through a line from the condenser to a safety blow-off line.

The desired temperature is maintained by manually adjusting the globe valves in the steam lines to the two vessel jackets. While automatic temperature control would be advantageous, this manual method has been found practical.

"Junior!"

At the end of the secondary cleaning cycle, the cleaning fluid is returned to storage and the bundle is removed and again washed with hot water. If not being returned immediately to service, it is recommended that it be sprayed with Ensis Fluid No. 210 as soon as dry.

Optimum Conditions

Experience at Martinez has shown that Shell TS-11 is an excellent solvent for oil removal or degreasing. Oakite 19 can be used as a liquid cleaner where all of the oil cannot be removed by solvent due to stratification or some other characteristics of the deposit. In either of the above cases, the residual scale is removed by Oakite 88. Spent soda containing phenolic compounds was tried following TS-11 extraction and was found to be intermediate in efficiency between Oakite 19 and 88.

It should be emphasized that the use of the above solvents is not proposed as a standard for all types of deposits. The best solvents or combinations thereof for cleaning bundles in various services can only be determined experimentally.

Normally about 24 hours of degreasing, using the highly aromatic solvent TS-11 under refluxing conditions at 270° F. and atmospheric pressure, gives excellent results.

The soaking stage using Oakite 88 at 200° F. plus or minus 10° usually requires a minimum of 48 hours. Experience and inspection are the best guides since the time required depends on the type, condition, and amount of scale deposit on the tubes. Some deposits, notably polymerized furfural, are more susceptible to alkaline type than acid-type cleaners.

Results

The type of cleaning obtained at Martinez is illustrated in Figs. 4, 5, and 6. Fig. 4 is a photo of the residuum side of a crude-residuum exchanger in a crude-distillation unit before cleaning. Fig. 5 shows the same bundle after 24 hours of extraction with TS-11. The remaining residual dry carbonaceous scale noted in this photo is completely removed after soaking in hot Oakite 88 for 48 hours, Fig. 6.

Table I lists several exchangers of various types with comparative transfer rates before and after cleaning. It is immediately apparent that chemical cleaning of any type is a decided improvement over the previous method of circulating hot kerosine extract in place. The saving in fuel is summarized

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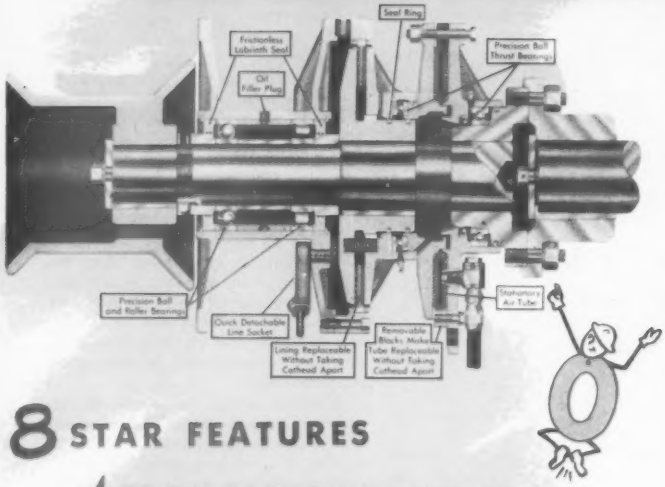
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in Table 2 along with other economic factors involved.

This mild cleaning method provides dual advantages. It cleans inside and outside tubes of a bundle down to bright metal. By avoiding abrasive mechanical methods, it also extends tube-bundle life. The approximate 3-day cleaning time can be a disadvantage in cleaning bundles during a turnaround. This is avoided by maintaining a small stock of spare bundles and operating the cleaning unit on a continuous schedule.

The method and apparatus here discussed are the subjects of patent rights of Shell Development Co.

BOOKS

PRINCIPLES OF DRILLING-MUD CONTROL. Ninth Edition. Published by American Petroleum Institute Southwestern District Study Committee on Drilling Fluids. $2.50.

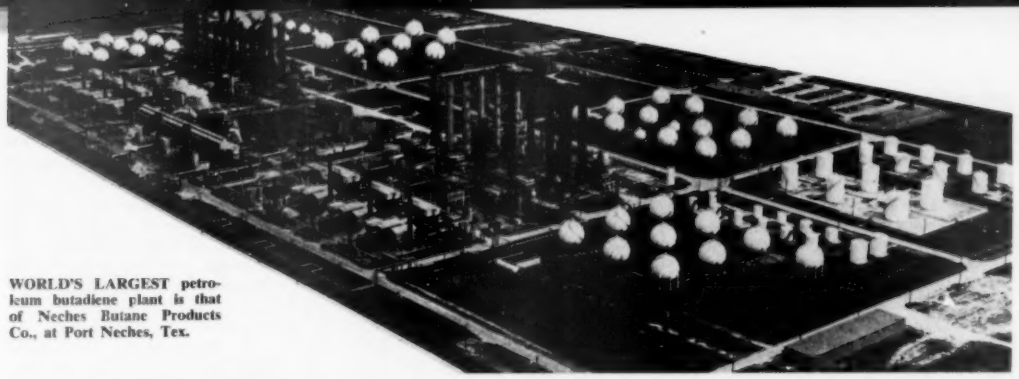
One new chapter on the Williston basin and three completely rewritten chapters on California, the Rocky Mountain area, and North Texas, Oklahoma, and Kansas are the new features of this edition. The new chapter on the Williston basin was written under the chairmanship of Kye Trout, consulting petroleum engineer, Dallas. The chapter on mud practices in California was prepared by the subcommittee of which W. R. Kelley, General Petroleum Corp., Bakersfield, is chairman, and the chairman of the subcommittee which prepared the Mid-Continent chapter is T. W. Keating, Stanolind Oil & Gas Co., Tulsa. J. H. Barnett, of Stanolind's Casper, Wyo., office, authored the chapter on mud practices in the Rockies.

HANDBOOK OF MOTION-PICTURE TECHNIQUE FOR BUSINESS MEN. By Charles Curran. Published by Times Square Productions, Inc., 145 West Forty-Fifth Street, New York 19. 53 pp. $2.50.

This booklet explains motion-picture taking in nontechnical language so anyone can understand it. Included is a useful glossary of nomenclature peculiar to the business, and a wealth of valuable pertinent information, especially concerning costs. It should be a real reference work for business men undertaking film projects.

THE OIL AND GAS DIRECTORY. (Texas, Louisiana, Oklahoma, and New Mexico.) Published by The Oil and Gas Directory, 1518 West Alabama, Houston 6. 608 pp. $22.50.

This directory covers the four southwestern states mentioned and lists the personnel and business in 423 towns and cities. A new feature is a complete index of all oil companies, drilling companies, producers, marketers, and oil-well service companies, making it one of the most complete books of its kind. The individual index also has been improved, every individual in the directory being listed by name, initials, and page number. Another improvement is the "telephone book" style listing of individuals under company names. All names are by title and the reader sees them at a glance. The volume is sturdily bound in a simulated leather cover, and is one that will find everyday use by its owner.



WORLD'S LARGEST petroleum butadiene plant is that of Neches Butane Products Co., at Port Neches, Tex.

PETROCHEM REPORT:

Neches Butane Products Co. Is Expanding Capacity

by F. Lawrence Resen
Gulf Coast District Editor

HIGHLIGHTING the activities at Neches Butane Products Co.'s Port Neches, Tex., butadiene plant is a $5,000,000 expansion program which will see the capacity of the plant increased by more than 10 per cent.

Principal product of the plant is butadiene-1,3 which is used primarily as a raw material for G.R.S. synthetic rubber. Expansion of facilities in 1952 will increase production capacity from 180,000 to 200,000 short tons per year.

The Neches plant is located within 20 miles of five refineries and uses the butane-butylene fraction of cracking-unit tail gases as its principal raw material. The charge stock is supplemented at times by smaller quantities of material containing butadiene and butylenes from various chemical plants.

Process . . . n-Butylene in the butane-butylene feed is first concentrated from a purity of about 25 to 85 volume per cent. Separation of the various C_4 hydrocarbons is achieved by a combination of simple fractionation, furfural-extractive fractionation, and cold sulfuric acid polymerization. Isobutane, n-butane, isobutylene polymer, and pentane are returned to the oil refineries.

The purified n-butylene stream is subjected to catalytic dehydrogenation in the next step at conversions of 25-35 per cent per pass. The concentrated fraction is mixed with steam at high superheat, the steam thereby serving as a heating agent to raise the stock to dehydrogenation temperature and also as a diluent to aid in control of the reaction.

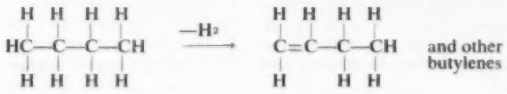
The dilute butadiene stream is—after compression and absorption—processed in a series of conventional fractionators and a furfural-extractive distillation. The separation of the product was a bottleneck in the development of the process for some time since butadiene boils at 23.5° F. and butylene boils at 21° F.

Unconverted n-butylene is recycled to the catalytic units and butadiene product is removed at 98 plus per cent purity.

Large plant . . . The Port Neches installation is the largest petroleum butadiene plant in the country. It was constructed during World War II and at the close of hostilities in 1945 it had a plant capacity of 125,000 short tons per year. However, due to a raw-material shortage, plant production was lim-

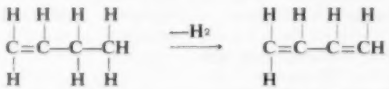
Equations . . . Butadiene From Butane

1. In thermal and catalytic cracking units, butane is partially dehydrogenated by heat and pressure to form a mixture of butylenes:

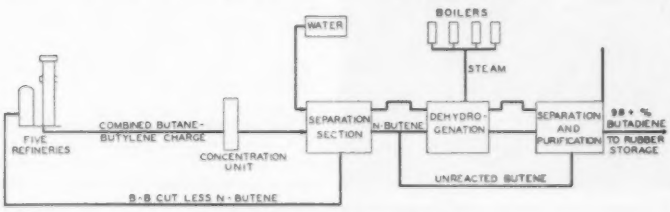


n-Butane C_4H_{10} n-Butylene C_4H_8

2. At high temperature and in the presence of a dehydrogenating catalyst the further dehydrogenation of n-butylene to butadiene takes place:



n-Butene Butadiene



Simplified process flow chart.

ited to 106,000 short tons for the year.

Production has varied during the postwar years as demand varied. With the immediate end of the war, production rose considerably and then tapered off as natural rubber became more plentiful. However, a new, continuous-type catalyst was developed and this along with numerous operating refinements boosted the potential plant capacity to 180,000 short tons per year. This production was made in 1951 under the impetus of the Korean situation. The present expansion will up this capacity by 20,000 tons.

Unusual facilities . . . Almost all of the prime movers at Neches are steam powered. To meet these requirements and a large process steam demand, a large central steam-generating plant, consisting of six boilers with a combined capacity of 3,000,000 lb. of steam per hour at 450 psig., was constructed.

A unique feature is the large number of pressure-storage spheres used. There are 51 such vessels with a combined capacity of 320,000 bbl. An additional six spheres which will be added under the current expansion will increase this type of storage by 47,000 bbl. Total investment at the Port Neches plant, including the current expansion, exceeds $60,000,000.

Gulf Oil Corp. Enlarging Chemical Interests

GULF OIL CORP. is embarking on a large expansion program for the manufacture of basic petrochemical materials, with the initial emphasis on an ethylene plant now in the final phases of construction at Port Arthur, Tex.

The increased interest in petrochemicals by Gulf may be further seen by its current investigation of the possibility of increasing ethylene production by the construction of a second plant at least as large as the 180-million-pound per year capacity installation now being built.

Coupled with the ethylene plant in a $19,000,000 building program is an isooctyl alcohol plant which will produce 9 million pounds of the heavy alcohol. Both installations are due for completion by the end of this year.

Ethylene . . . The ethylene plant will utilize byproduct gases produced in the refining processes at Gulf's nearby refinery at Port Arthur, and will deliver the ethylene produced to various Texas chemical plants by means of a 138-mile ethylene pipe-line network *(The Oil and Gas Journal, April 11, 1952, page 78).*

Part of the ethylene production will be obtained by separation of ethylene from refinery gases and the remainder by the cracking of ethane, also obtained from refinery gas streams.

As part of the ethylene project, a separate plant for the utilization of propylene, obtained both from the ethylene plant and the refinery, is under construction. The product will be propylene polymer for use either as high-grade fuel or as base-stock for detergent manufacture.

GULF'S ETHYLENE PLANT at Port Arthur is expected to be on stream by the end of the year. Capacity will be 180 million pounds per year.

Alcohol . . . The isooctyl alcohol process represents an improvement of the German Oxo process. It can be modified to produce not only chemicals related to isooctyl alcohol but other alcohols as well, depending on the needs of the industry. The principal raw material is a highly refined synthesized olefin, and the plant will be a revamp of an existing hydrogenation plant.

Related to Gulf's petrochemical activities are the sulfur plants scheduled for completion in 1952-53. One of these at Port Arthur will extract 21,000 long tons of sulfur annually from sour refinery gases. The other plant at Waddell in Crane County, Texas, will extract 7,000 long tons annually from sour natural gas.

In addition to these installations, Gulf is also planning to construct a sulfuric acid plant at Port Arthur to provide acid for use in refinery processing.

Carbide & Carbon Building At Torrance, Calif.

A NEW $36,000,000 plant for the production of polyethylene and ethylene glycol is scheduled for construction by Carbide & Carbon Chemicals Co., in Torrance, Calif.

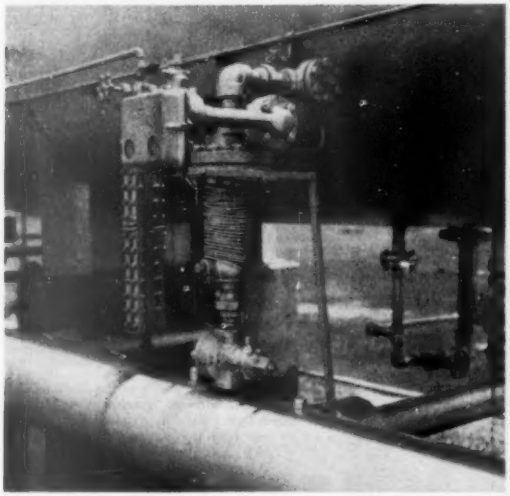
A 140-acre tract, immediately adjacent to the Torrance refinery of General Petroleum Corp., has been chosen for the plant. Carbide has entered into a 20-year contract with General Petroleum for the supply of raw materials.

First on West Coast . . . The plant is designed to produce 50 to 60 million pounds of polyethylene and from 5 to 10 million gallons of ethylene glycol per year. It will be the first plant on the Pacific Coast to manufacture these materials. It is expected to supply the needs of glycol and polyethylene for the West Coast and the mountain states.

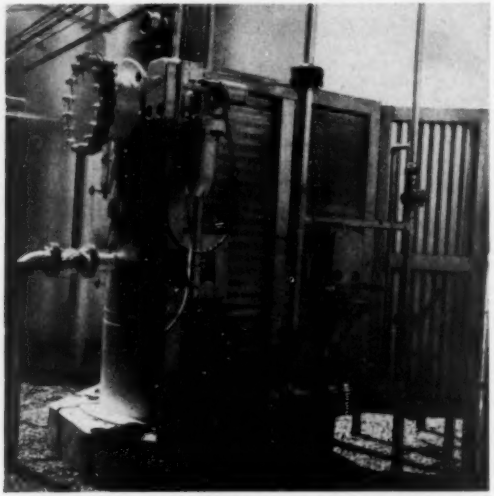
Ethylene oxide, an intermediate in the production of ethylene glycol, will also be manufactured at the plant.

Special attention has been given to the question of air pollution, a very acute problem in this location. Natural gas will be used as plant fuel to prevent smoke production. No acids are used in the chemical operations involved, and no fume-producing by-products will result.

Other operations . . . Carbine & Carbon, which is a division of Union Carbide & Carbon Corp., operates similar petrochemical plants in South Charleston, W. Va.; Institute, W. Va.; Texas City, Tex., and Whiting, Ind.



COPPER TUBING wrapped around this liquid-level controller at Taylor Oil & Gas Co.'s McAllen, Tex., cycling plant is charged with steam during low-temperature extremes to keep unit operating freely, accurately.



METAL SHIELDS such as the one shown are in use here at American Republic Corp.'s Silsbee, Tex., gasoline plant, protect diaphragm valves from cold blasts of north winds during winter months. They are removable.

Winter's just around the corner, so . . .

Get your equipment ready NOW!

SINCE "old man winter" is just around the corner, and we all know what havoc can be wrought when he goes on an unexpected "tear," let's devote a little time and space toward beating him to the "punch."

Operators in the fields and in the plants are faced with prospects of low-temperature extremes. Their effect on exposed equipment—whether it be delicate instruments for plant use, recording gadgets, or just plain trucks and tractors, the first sharp cold "snap" usually finds some one "caught with equipment down."

The first cold spell can result in jammed regulators, plugged instrument lines, and sluggish valve action. Winter downtime can be costly for motorized equipment unless it has been "winter conditioned," also.

First, we'll give you some suggestions on how to take care of your instruments, then we'll treat motorized equipment (with special emphasis on tractors) in the same manner . . .

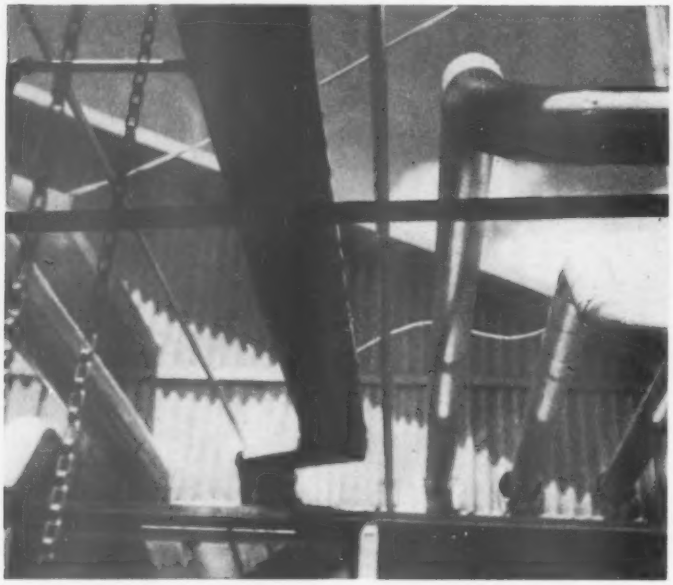
Protecting Instruments

What to do—1 . . . An example of how instruments can be safeguarded in wintertime is exemplified in the treatment given by The Chicago Corp. at its Coastal Plant in Nueces County, Texas. Outdoor instrument lines have received special treatment to prevent freezing weather from causing the lines to clog. Lines have been arranged so they run parallel and adjacent to other lines where possible. The group of lines are then encased in sheet metal, in the center of which is strung a 1-in. perforated pipe. This pipe is connected to an exhaust-steam supply so that when temperatures drop to a certain level, steam will be turned into the pipe and into the metal jacket surrounding the instrument lines. Steam bath resulting serves to maintain the instrument lines at a high enough temperature to insure proper functioning of the lines.

What to do—2 . . . Normal operation of pressure regulators and automatic-diaphragm valves is vital to the performance of any plant. To insure continued functioning of such pieces of equipment during freezing weather, Taylor Oil & Gas Co. uses a steam-coil arrangement at its McAllen, Tex., cycling plant. Copper tubing is externally wound about the working section of pressure regulators, diaphragm valves, and liquid-level controllers. This tubing is connected to a steam supply; as the temperature drops, steam is turned into the tubing, serving to keep working parts operating freely. Exhaust steam has been proven a cheap source of supply.

What to do—3 . . . At American Republics Corp.'s Silsbee field, Texas, gasoline plant, another means is used to protect equipment from low-temperature extremes. In this particular plant location, winters are usually mild and not severe enough to require special precautions. However, constant blast of cold winds can frequently hamper operation of automatic valves and regulators, and to offset the effects, metal screens have been erected on the north side of unsheltered installations to protect them from direct wind. Screens are easily made and are inexpensive, fabricated from corrugated sheet metal, supported on wooden frames.

What to do—4 . . . Vital points on flow lines and instruments exposed to



SHEET-METAL JACKETING is used by The Chicago Corp. at its Coastal Plant, Nueces County, Texas, to protect lines from low-temperature extremes. At upper left is the steam line which is perforated within the jacket to allow steam to escape, warm tubing.

WISE TRACTOR maintenance includes the removal and thorough cleaning of the crankcase breather. This is a good thing to do on all motorized equipment, also.

cold weather are enclosed in sheet-metal houses at McMurrey Refining Co.'s Tyler, Tex., refinery. The front of the house consists of a removable section, which allows easy access to the units for servicing purposes. The sheet-metal structures are made of varying sizes to accommodate the many installations which they are designed to protect at the plant, and are an inexpensive means of insuring against unit freeze-ups.

Protecting Motorized Equipment

According to Fred J. Shreck, supervisor of service, Industrial Power Division, International Harvester Co., the strain of low-temperature starting and the use of incorrect grades of oil often turn small defects into breakdowns. Of course cold weather repairs are difficult to make in the field.

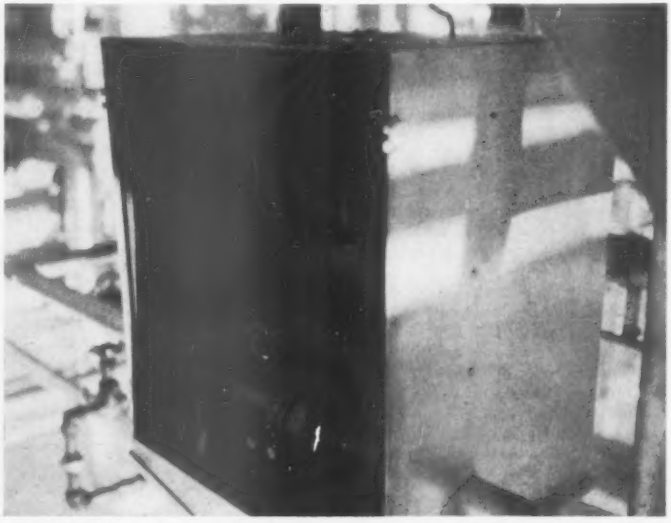
Shreck refers to tractors in particular, but his suggestions for protecting them can well be applied to other motorized equipment.

Here's what to do, according to Shreck:

1. Check for oil leaks . . . Look for collections of new oily dirt in odd places. In case of a dirty engine, look for places where leaking has streaked the dirt. Make the same careful visual inspection of the engine transmission and final drive housing, the sprocket gear, and track rollers (on tractors).

2. Clean the vehicle and engine. . . . This is important, because (a) proper cooling of the engine is aided, (2) oil leaks show up faster, and (3) fire hazard is decreased.

Be sure you are using the proper oils for proper cooling of the engine. This is important, for light winter oils run hotter than heavier oils. Oil film protecting moving parts gets thinner as oil temperature rises. Thus any crankcase-dirt pack left on impedes proper cool-



SHEET-METAL HOUSES protect vital points on flow lines and instruments exposed to weather at McMurrey Refining Co.'s Tyler, Tex., refinery. Fronts of the houses are removable, allowing easy access for servicing.

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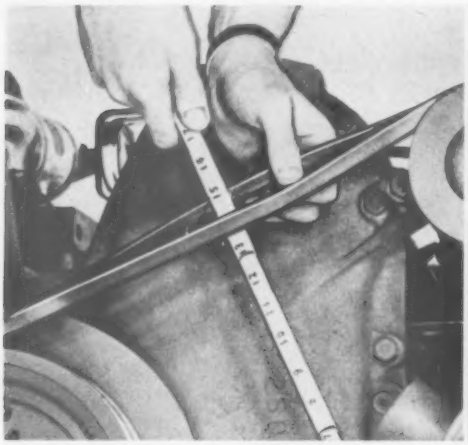


BE SURE FAN BELT is properly adjusted when servicing the engine's cooling system. This is an important step in preparing motorized equipment for winter operation.

WHEN PREPARING for winter operation, always be sure that equipment manufacturer's recommendations are followed for correct lubricant grades.

ing of light oils, reducing their lubricating effectiveness.

3. Check lubrication system . . . Begin with the crankcase. Drain old oil from a thoroughly warmed-up engine—preferably after a day's run. Flush crankcase with regular crankcase flushing oil, not diesel fuel or kerosine. Run engine at half throttle with flushing oil for ½ hour. Drain oil filter, wipe inside with clean rags, replace old filter elements with new. Refill crankcase with correct grade of oil. Change oil in fuel-injection pump but do not flush.

Transmission, final drive, and sprocket drive (on tractors) should be checked. Drain lubricant, without fail, then put in flushing oil and run motor for 15 minutes without load. Drain and refill in accordance with manufacturer's recommendation.

Refill a lubricating gun with proper lubricant and force old lubricant out of track rollers (on tractors) with new. Follow with complete chassis lubrication. Wipe off all excess, as it gathers dirt.

4. Check combustion system . . . Be sure it is adjusted properly. Start by cleaning plugs, properly space gaps. Check all plug wires and connections. Adjust or replace magneto or distributor points as needed. Remove, disassemble, and wash air cleaner, then reinstall after filling with proper-grade oil.

5. Check cooling system . . . Check for leaks in head gasket. This can be done by removing radiator cap and filling level with cap. Start engine and run long enough to open thermostats. Accelerate suddenly. If bubbles appear, you need a new gasket. Check for leaks in hose, connections, and water-pump packing. Check radiator for leaks. Flush radiator with cleaning compound. Drain completely and refill with anti-freeze called for by the manufacturer. Also check fan belt and fan-belt drive pulley for looseness, and adjust.

6. Check engine-ventilating system . . . Proper combustion and lubrication are assured when the system is thoroughly clean. This is important because pipes take out condensation which often causes corrosion and failure of valve springs and rocker arms. Check the ventilating system frequently during the cold-weather operation.

7. Check the electrical system . . . Clean battery terminals and grease them. Check specific gravity of cells with hydrometer. Bring up water level with distilled water. Look for wornout brushes on commutator and generator armature. Check voltage regulator, starter, generator,

Starting "Tips"

For motorized equipment working and parked for extended periods in cold weather, it is a good idea to equip them with hood sides (particularly tractors). Avoid parking in exposed places for long periods of time without running the engine.

If necessary to keep your truck or tractor out all the time during the winter, be sure and run it at least once each day.

In temperatures of 10° F. or below, dilute oil in the air cleaner and crankcase with kerosine in accordance with the manufacturer's specifications. Be sure and fill fuel tanks at the end of each work day in order to prevent the collection of moisture in the tanks.

Storing for Winter

If you decide to store your truck or tractor for the winter months, wash it first, making sure it is thoroughly clean, and then store it in a dry and protected place.

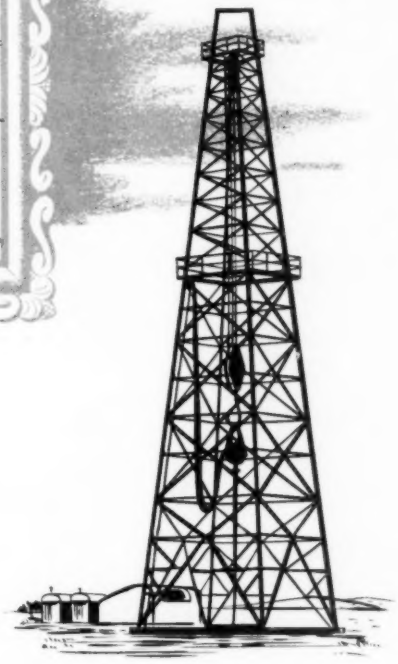
Completely lubricate the vehicle. Drain the diesel-fuel tank, water trap and fuel filters; open air vents and secure complete drainage. Then close the vents. Work flushing oil through the fuel-injection system as recommended by the manufacturer.

Get gasoline out . . . It is important that all gasoline is drained from the gasoline tank, strainer bowl, and carburetor. Drain all water from the cooling system. Attach an oil can to an air gun and, while using a light oil with a rust inhibitor, spray the inside of the spark-plug holes, inside the valve cover, and all surfaces above the oil level. Then spray inside the gasoline and fuel-oil tanks.

With these simple precautions, whether you work or store your motorized equipment this winter, it will last you a lot longer and stay "on the job" without failing you when winter comes.

The Financial Picture

IS DIFFERENT, TOO!



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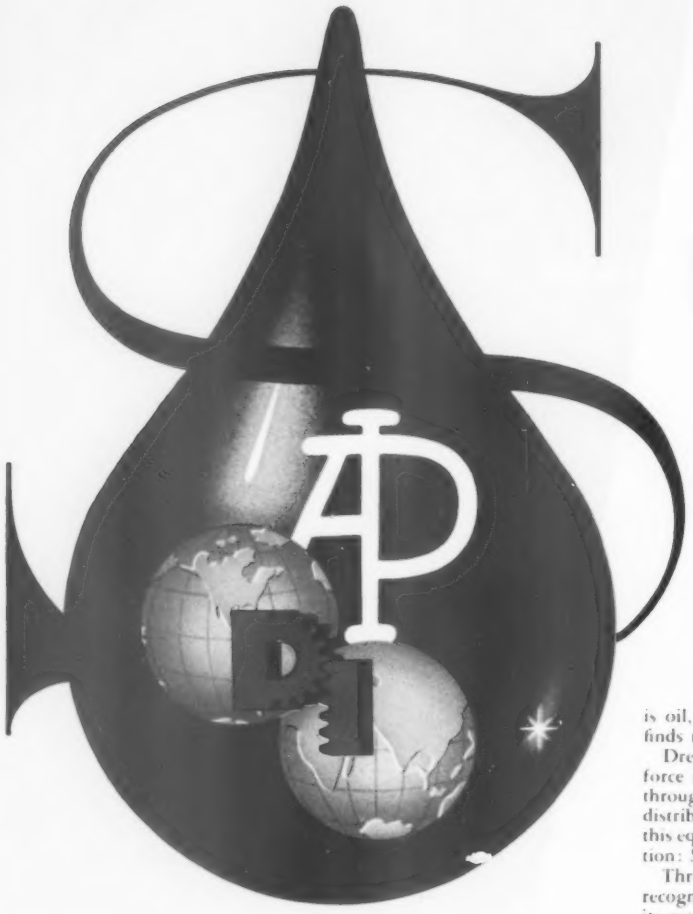

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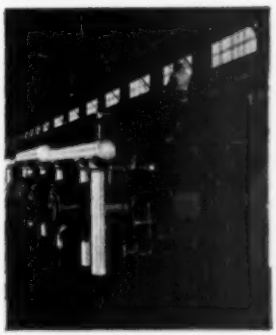

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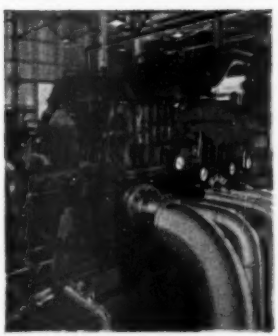

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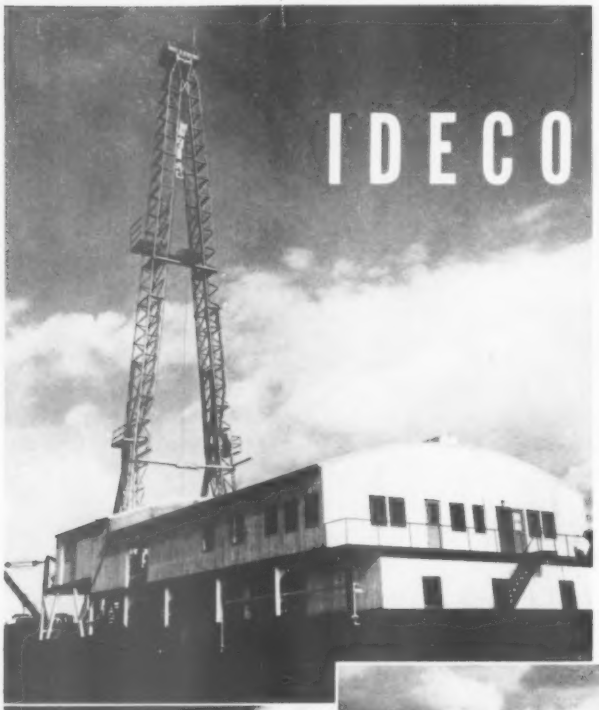

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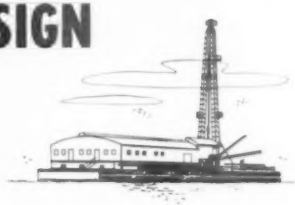

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No. 29

FANS AND BLOWERS:

Part 10—Calculating Fan Pressure

by M. Van Winkle*

THE total fan pressure is evaluated from: $-p_w = \Delta p_s + \Delta p_v + p_f$

Thus the fan pressure is the algebraic sum of the change in static pressure, the change in velocity pressure, and the pressure loss caused by frictional effects.

Example . . . Calculate the total fan pressure necessary to deliver air at 70° F. to the atmosphere at 29.92 in. Hg pressure from a storage room at a pressure of 29.88 in. Hg at the rate of 24,000 cu. ft. per minute through the duct system shown in Fig. 1.

Solution:

$$-p_w = \Delta p_s + \Delta p_v + p_f$$

1. Evaluate Δp_s:

$$\Delta p_s = p_2 - p_1 = (29.92 - 29.88)\,(13.596) = 0.544 \text{ in. } H_2O$$

2. Evaluate Δp_v:

$$\Delta p_v = \frac{\rho\,(v_2^2 - v_1^2)}{(2g)\,(3,600)\,(5.20)}$$

$v_2 = 0$

$v_1 = 0$

$\Delta p_v = 0$ in. H_2O

3. Evaluate p_f:

(a) Calculate p_{fe}, entrance loss.

Factor F from Fig. 2, Part 8, of this series, The Oil and Gas Journal, October 27, for smooth rounded entrance = 0.03.

Duct velocity pressure:

$$v = V/A = \frac{24,000}{[(40)\,(40)]/144} = 2,160 \text{ ft./min.}$$

$$p_v = \left[\frac{v_1 - v_2}{1,096/\rho^{0.5}}\right]^2 = (2,160/4,004)^2 = 0.291 \text{ in. } H_2O$$

$$p_{fe} = p_v F = (0.291)\,(0.03) = 0.0087 \text{ in. } H_2O$$

(b) Calculate p_{fe}, expansion loss.

Note: This expansion loss can be considered the same as entrance loss through a 15° cone but both upstream and downstream velocities must be used in calculating the Δp_v term.

v (40-in. by 40-in.) section = 2,160 ft./min.

$$\text{v (48-in. by 48-in.) section} = \frac{24,000}{(48 \times 48)/144} = 1,500 \text{ ft./min.}$$

$$\Delta p_v = [(v_1 - v_2)/4,004]^2 = [(2,160 - 1,500)/4,004]^2 = 0.0272 \text{ in. } H_2O$$

$F = 0.42$ (Fig. 8)

$p_{fe} = (0.42)\,(0.0272) = 0.0114$ in. H_2O

(c) Calculate outlet loss, p_{fo}:

$$p_{fo} = [(v_1 - v_2)/4,004]^2 = (1,500/4,004)^2 = 0.103 \text{ in. } H_2O$$

(d) Calculate frictional pressure drop in straight duct and elbows. Consider each cross-section separately.

40-in. by 40-in. section:

$$D_H \text{ (40-in.)} = 4R_H = 4\left[\frac{(40)\,(40)}{144} \Big/ \frac{(4)\,(40)}{12}\right] = 3.33 \text{ ft.}$$

$v_{40} = 2,160/60 = 36$ ft./sec.

$\rho = 0.075$ lb./cu. ft.

L (elbow) = 10D = (10) (3.33) = 3.33 ft.

L (st. duct) = (6 + 90) = 96 ft.

Total L = 96 + 33.3 = 129.3 ft.

$$Re = Dv\rho/\mu = \frac{(3.33)\,(36)\,(0.075)}{(0.000672)\,(0.0179)} = 74,900$$

$$p_{fs}\text{ (40-in.)} = [0.00540 + 0.397/(74,900)^{0.3}] \times L/D_H \times \rho/g \times v^2/2$$

$$= [0.00540 + 0.397/(74,900)^{0.3}] \times (129.3/3.33)\,(0.075/32.2)\,(36^2/2)$$

$= 1.11$ lb./sq. ft.

$= 1.11/5.2 = 0.214$ in. H_2O

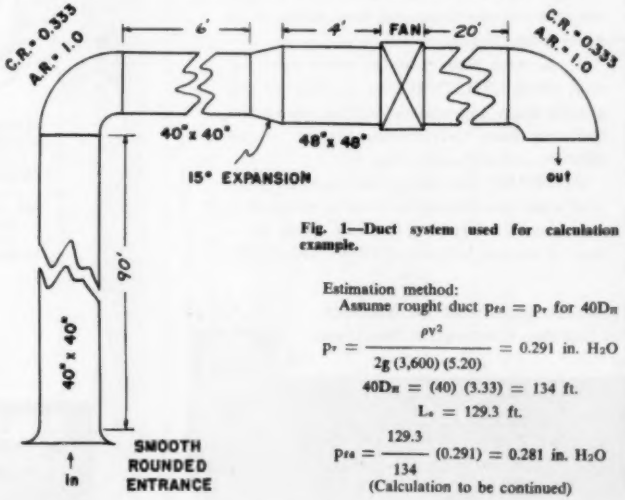

Fig. 1—Duct system used for calculation example.

Estimation method:

Assume rought duct $p_{fs} = p_v$ for $40D_H$

$$p_v = \frac{\rho v^2}{2g\,(3,600)\,(5.20)} = 0.291 \text{ in. } H_2O$$

$40D_H = (40)\,(3.33) = 134$ ft.

$L_s = 129.3$ ft.

$$p_{fs} = \frac{129.3}{134}\,(0.291) = 0.281 \text{ in. } H_2O$$

(Calculation to be continued)

*Professor of chemical engineering, University of Texas.

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Part 11 of a series

by Dr. B. E. Lauer, Head, Department of Chemical Engineering, University of Colorado

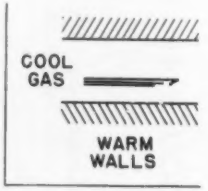
h_f HEAT TRANSFER

COEFFICIENT of HEAT TRANSFER through FILM between WARM PARALLEL FLAT SURFACES and COOL GAS

Position of Plates: Horizontal

Gas Movement: Streamline Flow

EQUATION:



$$h_f = 1.65\left[\frac{k}{2d}\right]\left[\frac{V\rho c}{kL}\right]^{\frac{1}{3}}$$

TERMINOLOGY:

- h_f - Individual coefficient of heat transfer, BTU/hr. sq. ft. °F.
- k - Thermal conductivity, BTU/hr. sq. ft. °F./ft.
- d - Distance between plates, in ft.
- V - Velocity, ft./hr.
- ρ - Density, lbs./cu. ft.
- C - Specific heat at constant pressure, BTU/lb. °F.
- L - Length of plates in direction of flow, in feet.

LIMITATIONS:

This equation applies only to streamline flow with Reynolds number less than 2100, with a parabolic velocity distribution and the absence of free convection currents. The term $(V\rho C/kL)$ must be greater than 10.

SOURCES OF DATA:

For physical constants for use in above equation see Chemical Engineers' Handbook - J. H. Perry (1948).

for ρ -- see pp. 130-148, 175-195, 1583.
μ -- see pp. 370-374, 1198, 1696.
β -- see pp. 200-208.
k -- see pp. 459-461, 1303, 1697.
C -- see pp. 225-238, 297, 1588, 1696.

REFERENCES:

1. A. P. Colburn, Trans. Amer. Inst. Chem. Eng., 29, 174-210, (1933).

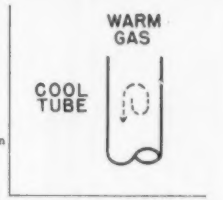
2. Kirkbride and McCabe, Ind. Eng. Chem. 23, 625-631, (1931).

COEFFICIENT of HEAT TRANSFER through FILM between INSIDE SURFACE of a COOL TUBE and WARM GAS

Tube Position: Vertical

Gas Movement: Natural Convection

EQUATION:



$$h_f = 0.11b\ K\left[\frac{\rho^2 \beta\, \Delta t + g}{\mu^2}\right]^{\frac{1}{3}}$$

TERMINOLOGY:

- h_f - Film coefficient of heat transfer, BTU/hr. sq. ft. °F.
- K - Thermal conductivity of gas at t_f, BTU/hr. ft.^{2} °F./ft.
- ρ - Density of the gas at t_f, lb./cu. ft.
- g - Acceleration of gravity. 4.17×10^8 ft./hr.^{2}
- β - Coefficient of volumetric expansion of gas at t_f; for ideal gas is equal to $1/°R.$ (cu.ft./cu.ft.)/°F.
- Δt - Temperature difference between wall and gas, °F.
- μ - Viscosity of gas at t_f, lb./ft. hr.
- C - Specific heat of gas at constant pressure, BTU/lb. °F.
- t_f - Film temperature, assumed as arithmetic average of wall temperature and bulk gas temperature, °F.

LIMITATIONS: This equation is suitable for use with diatomic gases or those gases which obey the perfect gas law.

PHYSICAL CONSTANTS: The values of the physical constants such as density, viscosity and others are reported in the International Critical Tables, in several handbooks, and in the technical literature.

Page references in the Chemical Engineers' Handbook, J. H. Perry (1948) are as follows:

for ρ -- 130-148, 175-195, 1583.
μ -- 370-374, 1198, 1696.
β -- 200-208, 1878.
k -- 459-461, 1303, 1697.

REFERENCES:

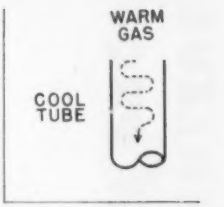
1. Colburn & Hougen, Ind. & Eng. Chem., Vol. 22, p. 522, (1930).

COEFFICIENT of HEAT TRANSFER through FILM between INSIDE SURFACE of a COOL TUBE and WARM GAS

Tube Position: Vertical

Gas Movement: Turbulent Flow

EQUATION:



$$h_f = 0.0265\,\frac{K}{D}\left[\frac{DV\rho}{\mu}\right]^{0.8}\left[\frac{c\,\mu}{K}\right]^{0.3}$$

TERMINOLOGY:

- h_f - Coefficient of heat transfer, BTU/hr. sq. ft. °F.
- D - Inside diameter of tube, ft.
- K - Thermal conductivity of gas, BTU/hr. ft.^{2} °F./ft.
- V - Velocity of gas, ft./hr.
- ρ - Density of gas, lbs./ft.^{3}
- μ - Absolute viscosity of gas, lbs./hr. ft.
- C - Specific heat of gas BTU/lb. °F.
- p - Pressure of the gas in lb/sq. in. ga.

LIMITATIONS: Properties taken at average temperature of gas. Reynolds number must be greater than 2100, $\theta \pm V\rho$ must be greater than $1.650p^{0.425}$.

Valid for gases heated or cooled and for liquids for Reynolds number $(DV\rho/\mu)$ greater than 2100, if the Prandtl number is less than 10. Applicable to fire tube boilers. Prandtl number $(C\mu/K)$

SIMPLIFIED EQUATION: An approximate value for h_f can be obtained by application of the following equation.

$$h_f = 0.0144\,\frac{C(V\rho)^{0.8}}{D^{0.2}}$$

SOURCES OF DATA: For physical constants for use in above equation see Chemical Engineers' Handbook - J. H. Perry, (1948).

for ρ -- see pp. 130-148, 175-194, 1583.
μ -- see pp. 370-374, 1198, 1696.
k -- see pp. 459-461, 1303, 1697.
C -- see pp 225-238, 297, 1588, 1696.

REFERENCES:

1. Applied Heat Transmission, H. J. Stoever, p. 57, McGraw-Hill Book Co., New York, 1941.

2. Heat Transmission, W. H. McAdams, p. 167-169 (1942).

3. Univ. of Calif. Pub. Eng., Dittus and Boelter, Vol. 2, p. 443 (1930).

4. Introduction to Heat Transfer, Brown and Marco, p. 91.

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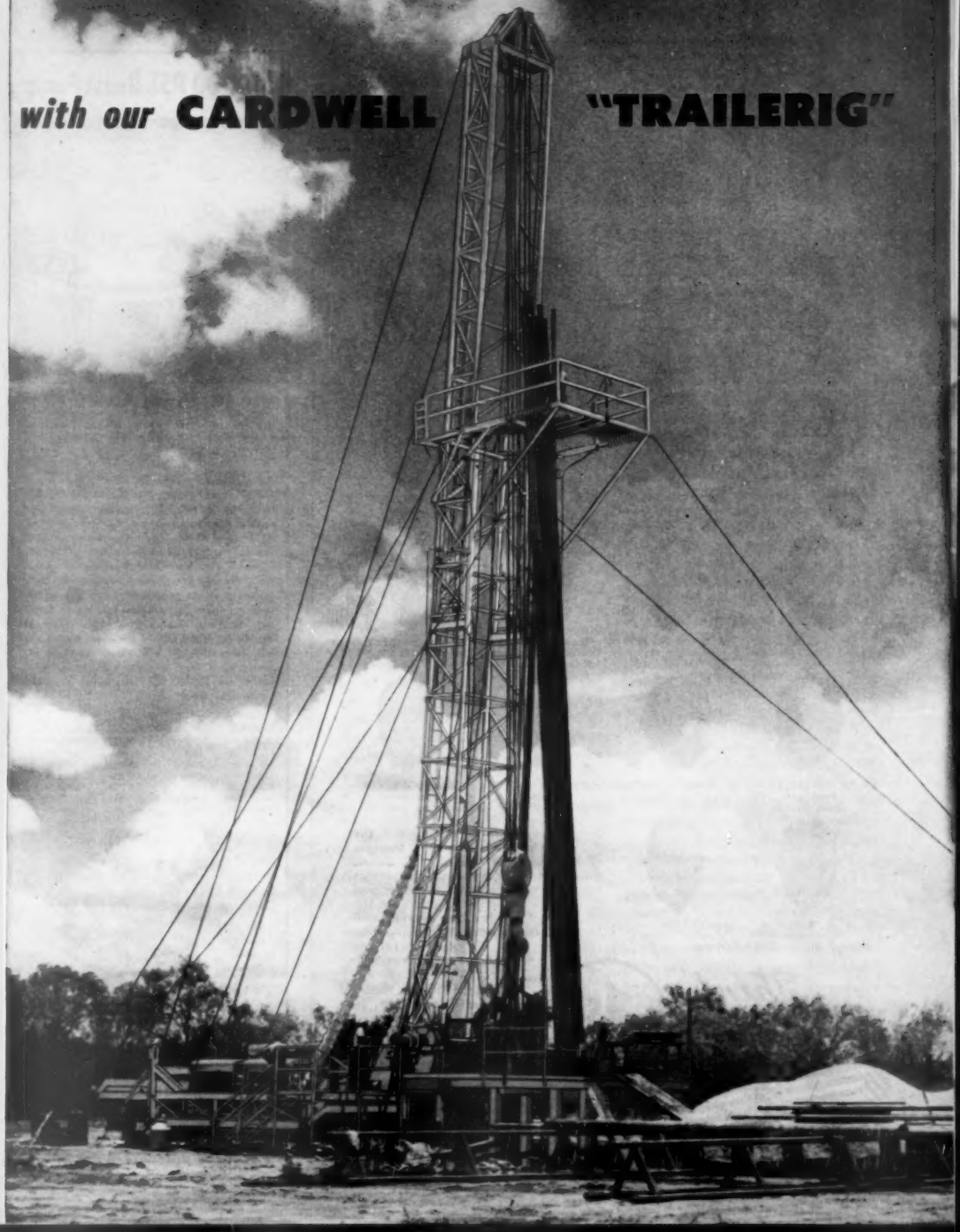

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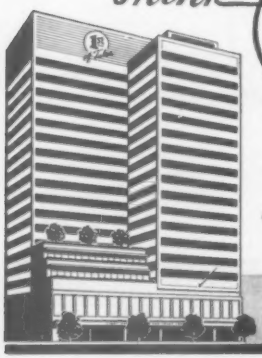

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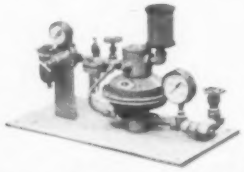
216-C-100	100:1	10,000 PSI.	$173.25
216-C-150	150:1	15,000 PSI.	$194.50
216-C-200	200:1	20,000 PSI.	$225.00
216-C-300	300:1	30,000 PSI.	$289.50



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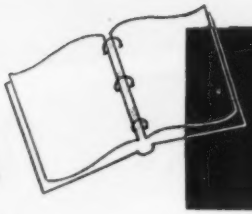

REFINER'S NOTEBOOK

ELECTRICAL INSTALLATIONS—4

Wiring Methods

by B. Z. Segall*

IN each of the three classes of hazardous locations set up by the National Electrical Code there are Division 1 and Division 2 locations.

Class 1, Division 1 locations are those in which hazardous concentrations of flammable gases or vapors exist continuously, intermittently, or periodically under normal operating or because of repair or maintenance operations, leakage, or due to breakdown or faulty operation of equipment or processes.

Class 1, Division 2 locations are those in which flammable volatile liquids or flammable gases are handled, processed, or used, but in which these will normally be confined within closed containers or closed systems from which they can escape only in case of accidental rupture or breakdown.

Further details are given in the code to illustrate what would constitute a Division 1 and a Division 2 location. The final decision must be made by the local code-enforcing authority.

Some inspectors have ruled out the Division 2 concept entirely and require complete compliance with Division 1 requirements throughout any hazardous areas. Economically,

*Consulting engineer, New Orleans.

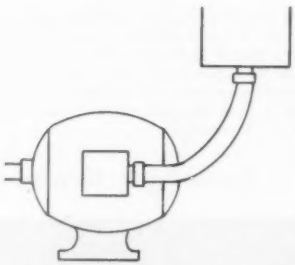

Fig. 1—Connection between motor and box must be explosionproof for Class 1, Division 1. For Division 2 this may be flexible metal conduit but must have a bonding jumper.

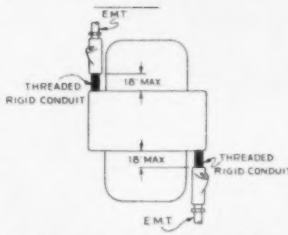

Fig. 2—Use of electrical metallic tubing in Class 1, Division 2, hazardous locations.

this principle of classifying the entire installation within a plant as Division 1 can be justified in some cases even though the initial capital investment is higher. Increased safety of the electrical system of the plant beyond that required by the code's minimum basic requirements can and has accrued for plant owners substantial savings derived from lowered insurance rates for the plants.

Wiring Methods

The wiring methods to be used require, basically, the installation of rigid metal conduit with threaded joints. Electrical metallic tubing (thin-wall conduit) may be used in Division 2 installations. In general, electrical metallic tubing (E.M.T.) may be installed in Division 2 locations beyond the point of "seal off." (See Figs. 1 and 2.)

In Class 1, Division 1 locations, explosionproof boxes and fittings must be used throughout the system. Where conduit is brought into these boxes and fittings, proper bosses or other approved threaded outlets must be provided to form threaded explosionproof joints. The code requires at least five full threads to be engaged at all threaded joints.

Of particular importance is the installation of the conduit lines themselves. Threads made up in the field on the conduit lines have made in many cases, for a most inefficient system. In some cases faulty threading of conduits have actually introduced hazards into wiring system.

In making field threads on conduits, dies should be used with stops to limit the number of threads cut on the conduits. The total number of threads should not exceed that shown by the "Rigid Conduit Industry Standard for Standard Rigid Steel Conduit." This will vary from approximately 7½ threads for ½-in. conduit to about 12 threads for 6-in. conduit for the normal effective thread length. Tapered dies should always be used. The nominal taper per foot should be ¾-in.

Another point to remember about the conduit system is to keep it all aboveground. Underground runs may have to be installed but every effort should be made to design the system so that all the conduit lines are exposed and readily accessible.

Flexible connections are permitted for Class 1 installations. For Division 1 locations these must be of the approved explosionproof type. For Division 2 areas the flexible connection may be made with standard flexible metal conduit. Such connections are usually required at motor terminals (Fig. 3).

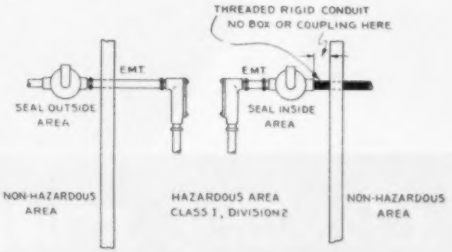

Fig. 3—Use of electrical metallic tubing in Class 1, Division 2, hazardous locations.

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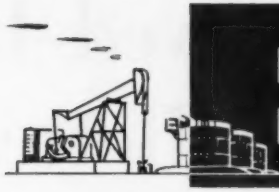

Explosive Limits of Mixtures of Natural Gas and Air

by Ralph F. Nielsen*

A CONSIDERABLE amount of research has been done to determine the composition limits within which mixtures of combustible gases with oxygen are explosive.[1,2]

Pressure has only a small effect on the lower limit, but the upper limit for light hydrocarbons is increased by about 1 per cent (of the total volume) for a six-fold pressure increase. The upper limit of methane (Fig. 1) is increased from 13 to 14 per cent when the pressure is increased from atmospheric to 75 psig. The limits for methane are lowered by 1 per cent when the temperature is increased from room temperature to 400° F.

The limits are greatly affected by the presence of an inert diluent. The limits for the gases methane through pentane are shown in Fig. 1.

A mixture of ethane and air must contain more than 3.2 per cent and less than 13 per cent ethane to be explosive. (For downward propagation the upper limit is 10 per cent instead of 13 per cent.) On the other hand, a mixture containing 40 per cent ethane and 60 per cent nitrogen (i.e., inert/hydrocarbons ratio = 1.5) must be mixed with air so that the final mixture contains not less than 7 per cent and not more than 22 per cent (20 per cent downward) of the original 40/60 mixture to be explosive.

The equation of Le Chatelier is used to calculate explosive limits. If a, b, c, etc., are the percentages of the pure constituents by volume, and A, B, C, etc., the respective explosive limits, then the explosive limit of the mixture is

$$\frac{100}{\frac{a}{A}+\frac{b}{B}+\frac{c}{C}+\text{etc.}}$$

The formula applies to either limit, depending on whether A, B, etc., represent upper or lower limits.

The above formula will be applied to a typical gas sample. An Orsat analysis gave CO_2 2.2 per cent, O_2 6.3 per cent, N_2 45.4, and hydrocarbons 46.1. A Podbielniak analysis of the hydrocarbons gave C_1 26 per cent, C_2 34, C_3 22, C_4 and heavier 18. The lower limits for the pure constituents (Fig. 1) are, beginning with methane, 6, 3, 2.4, and 1.8. The upper limits are 13, 10, 7, 5 for downward and 15, 13, 10, 8.5 for upward propagation. Applying Le Chatelier's equation, the lower limit for the hydrocarbon part is

$$\frac{100}{\frac{26}{6}+\frac{34}{3}+\frac{22}{2.4}+\frac{18}{1.8}}=2.9$$

Similarly the upper limit for downward propagation is 8.2 and for upward propagation 11.

To allow for the excess nitrogen the analysis must be recalculated. The nitrogen calculated to air is 79/21 times the oxygen percentage, and this plus the oxygen is the per cent air. The remaining nitrogen and the carbon dioxide are lumped together and called "excess inert gas." On this basis the analysis becomes air 30.0 per cent, hydrocarbons 46.1 per cent, excess inert gas 23.9 per cent, and the ratio Inert/hydrocarbons = 0.5.

Since the sample contains 70 per cent hydrocarbon plus inert, it does not contain enough air to be explosive. It is noted that the upper limit for the hydrocarbons alone was calculated above to be 8.2. Following parallel to the curves up to a ratio of 0.5 gives 11 per cent as the explosive limit for the hydrocarbons and inert. The sample contains 70 per cent of combined hydrocarbons and inerts and 30 per cent air so that enough more air will have to be added to bring this down to 11 and 89 per cent, respectively. Thus, 11 cu. ft. of hydrocarbon and inert require 89 cu. ft. of air to become explosive, so 1 cu. ft. of sample, which contains 0.7 cu. ft. of hydrocarbons and inert, requires (0.7/11) × 89 (minus the 0.3 cu. ft. of air already there) or 5.7 — 0.3 = 5.4 cu. ft.

For "dry" gases, composed mostly of methane, not much of an error would be made by interpolating between the methane and ethane curves on the basis of average molecular weight.

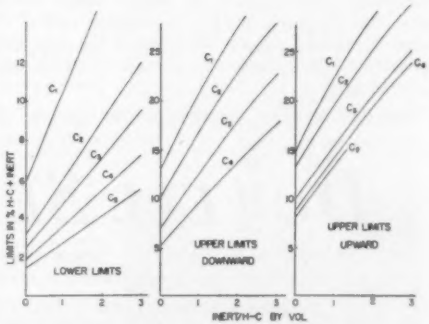

Fig. 1—Explosive limits for mixtures of hydrocarbons plus inert gas (nitrogen) with air.[1] (The percentage of air is given by 100 minus the ordinate.)

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*Associate professor, petroleum and natural-gas engineering, Pennsylvania State College.

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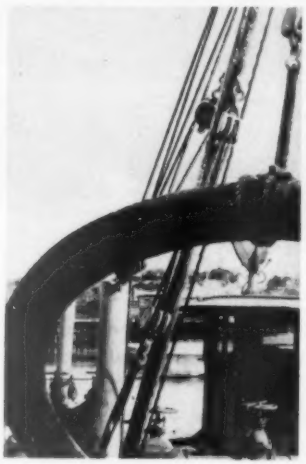
2.—How to Get More Service From Industrial Hose

by J. A. Muller*

PART 1 of this series was presented in **Modern Drilling** last week. Discussed then were the selection of the correct hose for the job, what hoses are made of, and care of the hose on the job. Also considered was the importance of hose couplings, especially for high-pressure service.

Construction . . . Rubber hose is manufactured by two processes: long length (lead press or molded) and mandrel built. The tubes for both types are made by the same extrusion process. In long length hose, the carcass consists of yarn or cord braided continuously over the tube, the cover is molded on the carcass. The carcass of a wrapped hose is usually fabric of synthetic or cotton yarn wound around the tube, or synthetic or cotton yarn braided around the tube. The cover is then vulcanized to the carcass.

*Executive engineer, Thermoid Co., Trenton, N. J.



Hose for handling fuel oil and gasoline is built with wire reinforcement to prevent collapse.

Hose for high pressure and steam service in which either steel wire or high tensile yarn is required for adequate reinforcement is mandrel built. The wire or yarn may be braided or wrapped by machine. Intermediate plies of fabric or asbestos may be used if required.

Selection . . . For long, efficient, economical life, the following factors should be considered:

1. Will the hose chosen withstand attack from the **material carried?** If a petroleum product is to be carried, an oil resistant hose should be specified. Paint and some insecticide sprays take a special hose. Steam requires a special hose.

2. **Working Pressure**—Stay within manufacturers limits. Some hose will handle extra pressure for a while but it will fail more quickly and more than likely, unexpectedly with damage to personnel and equipment and loss of production.

3. The **temperature** of both the material being carried and ambient temperatures should be considered. Low and high temperatures must be compensated for by special rubber compounds and constructions.

4. The inside diameter of a hose determines the **carrying capacity.** If the diameter is too small, you won't get the colume required. Too large a diameter means lower pressures.

5. Specify **enough length** to avoid stretching. Excessive length increases the chance of kinking.

6. The hose system is only as good as its **couplings.** Even the best hose can't operate with incorrect, improperly applied couplings.

7. Abrasion resistant covers are a must for **severe service conditions** such as mines, quarries, heavy industrial manufacturing.

Maintenance . . . Maintenance begins as soon as the roll or length of hose is received from the railroad or truck line. If the hose is not being used immediately, store inside out of direct sunlight in the manufacturers original wrappings. Do not unwrap and leave the roll outside in direct sunlight. If the roll must be left outside, put it out of harm's way.

When the hose is to be used, unwrap and unerate carefully. Don't slash at the bindings with a knife, you may cut gashes in the new hose. If delivered uncoupled, make sure the correct type and size of couplings are used. Check the length required before cutting. Use a sharp cutting tool and cut the hose square. Make sure the coupling is properly placed on hose, that it is inserted all the way in, that the securing clamps or other devices are tightened.

If the volume of coupling is large, a hose shop should be set up with proper tools and suitable personnel trained. If your organization uses thousands of feet of hose regularly, the value of a hose installation and maintenance crew should be investigated. The function of this crew would be to inspect hose regularly for weak spots, cuts and worn spots, loose couplings so that actual breaks would be avoided.

Keep the hose away from hot pipes, stoves and hot pieces of equipment. If contact with hot metal cannot be avoided, cover the hot spot with asbestos.

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by W. L. Nelson
Technical Editor

QUESTIONS ON TECHNOLOGY

Sulfur Content of Cracked Products

I—WEST TEXAS FEED STOCKS

How much sulfur is to be expected in the various products of cracking? We recall several articles on this subject but we hoped you would have more complete information.—S. M. T.

Although it is possible to state generalizations from the several excellent and pioneering papers [4,6,9,17] in the literature on this subject, the subject is of such importance that it will be completely surveyed. More information is available on West Texas stocks than other oils, and Figs. 1 and 2 serve to summarize the general situation. These figures also serve to indicate the degree of accuracy or perhaps lack of precise consistancy that is encountered.

Fowle and Bent [4] published the first complete paper on the distribution of sulfur among the products of cracking and it is still the most comprehensive information on the subject. This and other summarizing papers [5,6,7] present detail regarding weight balances, [4,5,20] reforming, [4] viscosity breaking, [4] effect of temperature, [4,5,7,20] effect of percentage conversion, [5,6,7] distribution of sulfur within products, [6,7] boiling range of products, [4,7] kind of catalyst, [5] lead susceptibility, [7,19] and kinds of sulfur compounds. [4,14] It is noteworthy that the sulfur content of the gasolines or naphthas is not much affected by the kind of cracking, that is, thermal or catalytic. Likewise, the catalytic cycle stocks appear to contain about the same amount of sulfur as thermally cracked distillates. No other crude oils (found in this study) behave like West Texas crude oils, except Panhandle Texas oils.

The sulfur content of products, when cracking stocks from other crude oils, will be discussed in additional installments of this answer.

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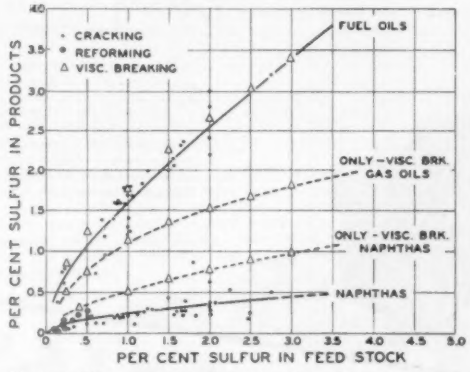

Fig. 1—Sulfur content of products when thermally cracking West Texas stocks.

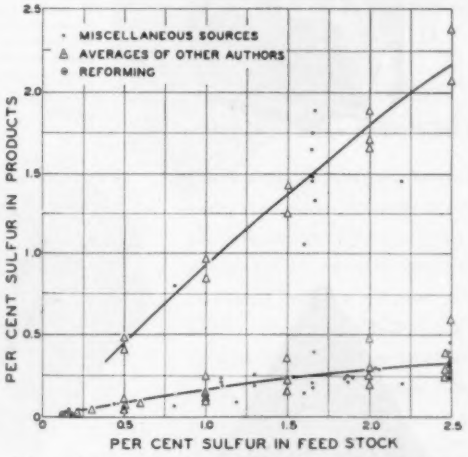

Fig. 2—Sulfur content of products when catalytically cracking West Texas stocks.

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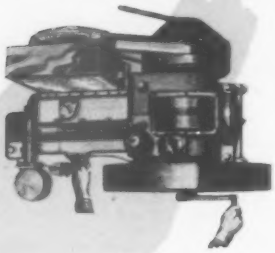

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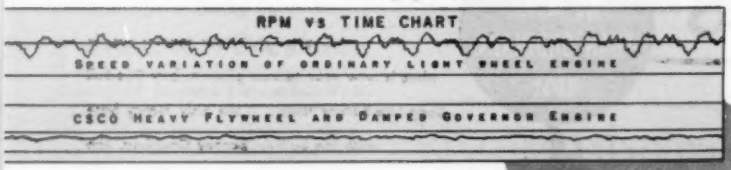

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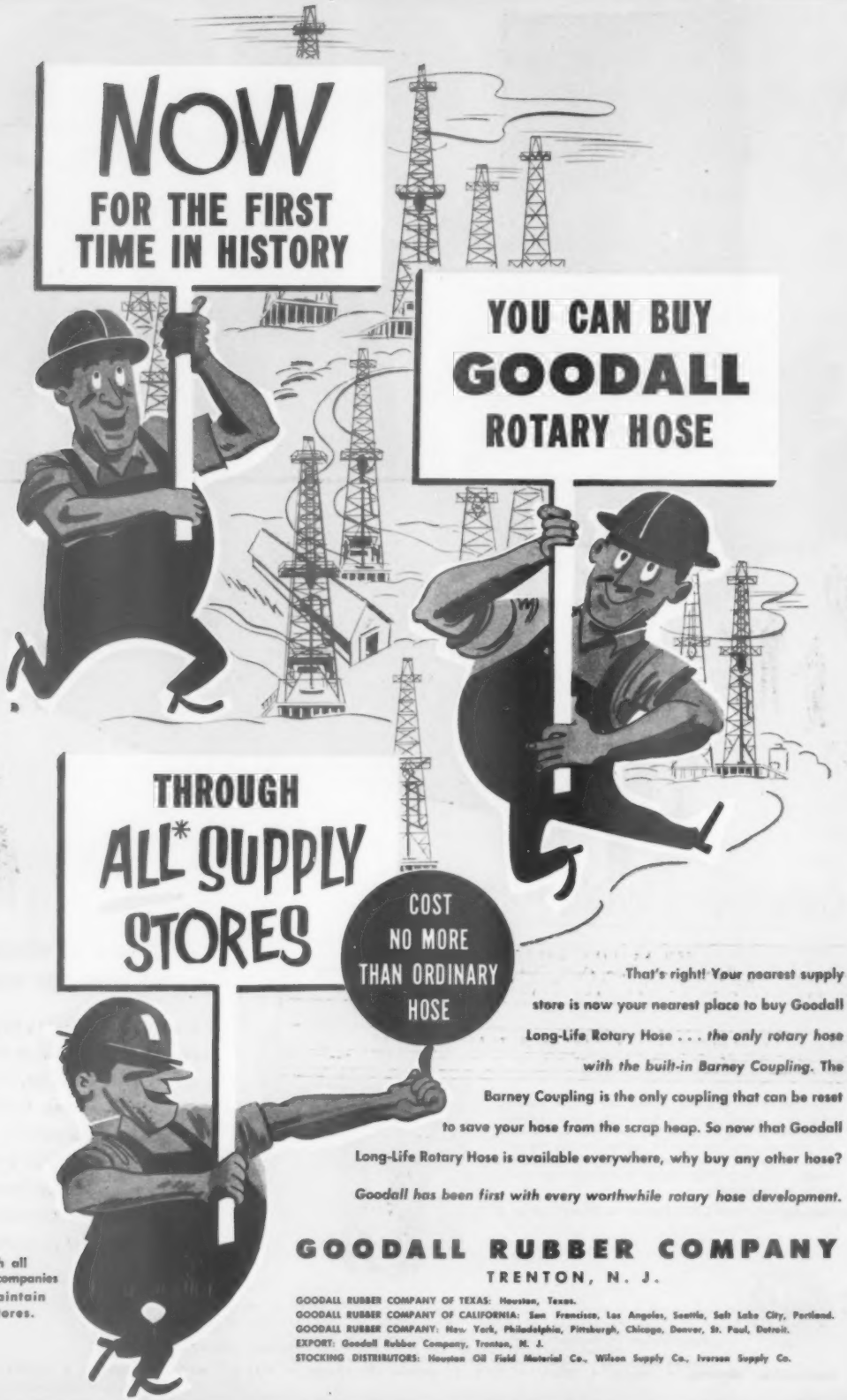

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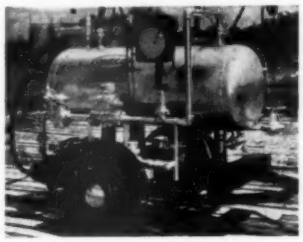
IT'S NEW CHECK IT

by Dan B. Miller

21 A NEW HORIZONTAL WELL CHECKER. An outstanding feature of the unit is a degassing and defoaming element placed on the inlet nozzle just inside the separator so that all of the well fluid must flow through it. This element removes all of the gas that is not in solution from the oil. Since it prevents foam, oil is in good condition to be metered, and thus provides for accurate results. Standard features are an 11 by 15-in. elliptical manway made in the inlet end of the vessel near the bottom so that drilling mud and sand can be easily and quickly cleaned from the unit. Another feature is a tool box large enough to hold a 36-in. wrench and several other tools and a Kimray floatless oil dump valve. Can be furnished with a number of optional items including a free-water knockout, any size and type oil and water meters, and any kind and size of orifice flange or fitting. Two typical models are the 24 WC-0106T rated at 1,200 bbl. per day oil, 600 bbl. per day water and 1½ billion standard cubic feet per day with a 2-in. gas run. Model 30-WC-0106T is rated at 1,600 bbl. per day oil, 800 bbl. per day water, and 1½ billion standard cubic feet per day gas with 2-in. run. A 3-in. gas run will meter 3 billion standard cubic feet per day and can be furnished on either unit. *Oil Metering & Processing Equipment Corp.*

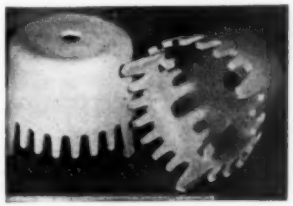


IT'S NEW CHECK IT

22 36-IN. SMOOTH PIPE BENDING MACHINE. The machine is portable, track mounted, and weighs 33,000 lb. The over-all length is 24 ft. 6 in. and width is 92 in. In recent tests, the new machine smooth bent cold pipe ½° per foot. The test pipe had a wall thickness of 0.393 in. and a nominal yield strength of 52,000 psi. (test specimen had a yield strength of 58,400 psi.). An advantage of vertical bending is that the degree of bend may be easily measured with a level or bubble-type protractor. Simply determine the level reading of each end of the pipe, add, and the result is the degree of bend. The simple operation of the machine speeds up bending and does not require an experienced operator for efficient operation. Only a small crew is required. *Crutcher-Rolfs-Cummings, Inc.*

IT'S NEW CHECK IT

23 BUBBLE CAPS OF HIGH-STRENGTH CERAMIC are for general use in fractionating and distillation towers where severe corrosion limits the useful service life of metal caps. Coors bubble caps can now be made of any of several special ceramic materials, depending upon the service conditions and the shape or design of the cap. Also the high-tensile properties and hardness of Coors ceramic materials make it resistant to mechanical damage and abrasive conditions. The bubble caps illustrated were made of Coors type AB-2 high-alumina ceramic which has a tensile strength of 18,000-20,000 psi. and a compressive strength in excess of 200,000 psi. In factory tests of physical strength, one of these caps was supported on the three legs and loaded vertically in a hydraulic press. Failure occurred at a load of 24,000 lb. *Coors Porcelain Co.*



IT'S NEW CHECK IT

24 IMPROVED ASSEMBLY RIVETED OIL-FIELD ROLLER CHAIN. Basically, the chain is supplied in A.S.A. standard and heavy series, 1 through 2½-in. pitch sizes in single and multiple widths. It is made up in

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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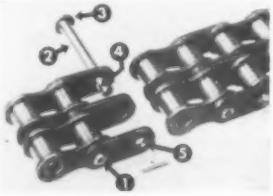
10-ft. lengths of riveted chain, having an exclusive single pin coupler installed at the most convenient intervals. The spacing of the couplers varies, depending on the chain size, but they are placed in the assembled chain so any length can be made up without cutting rivets or damaging parts. A single pin easily removed disconnects the chain and center links or spacer plates cannot move or fall out when disconnecting chain. One end of the single-pin coupler link is firmly riveted to the adjacent link. The other end contains the single-pin coupler pin. One end of this pin is spun over a washer, and the other end has a milled flat and locking pin hole. It is remarkably easy to remove, yet the press fit and locking pin on one end and the washer on the other assure a good tight fit over-all for maximum chain life. Each 10-ft. section of chain is boxed individually, and any even-pitch length of chain from two pitches up to 10 ft. can be made from one box of chain. Odd pitch lengths can be obtained by using a three-pitch riveted offset section. *Baldwin-Duckworth, Division of Chain Belt Co.*



IT'S NEW CHECK IT

25 LULL TRAVELOADER equipped with 54-in. material-handling forks is shown carrying a smoke stack 4½ ft. in diameter, 50 ft. in length, and weighing 9,500 lb., out of a very narrow storage. This particular unit

is used primarily for handling structural steel stock up to 62 ft. in length and, the company states, has proved successful. The Traveloader shown is a 10,000-lb.-capacity unit; 5,000 and 15,000-lb. capacity units are also available. The ability to carry long, heavy materials down narrow aisles as well as the ability to load, stack, and travel in 10-ft. aisles are the chief advantages of these units. The tower is hydraulically controlled and moves out to the side of the machine, picks up a load, and then moves in, placing the load on the decks. It lifts materials to 12-ft. heights and is also capable of tilting forward or back to either discharge or secure a load. *Lull Manufacturing Co.*

IT'S NEW CHECK IT

26 NEW PACKER eliminates the common cause of packer failures at four critical steps. Slightly smaller in diameter than most packers, the new packer runs in without difficulty and goes right through tight spots. Large fluid bypass areas permit fast running and premature setting is eliminated by the automatic clutch. Rugged construction prevents damage when running through tight places or foreign matter. Left-hand rotation is not required in setting the packer. Two turns to the right release the automatic clutch for setting and the clutch relatches when the tubing is raised. All working parts are completely enclosed to eliminate fouling from foreign matter and to assure positive setting. The packing element requires only small longitudinal compression to pack-off, resulting in longer compressed length with minimum distortion. Enclosure of all working parts within the housing eliminates difficulty in pulling since parts cannot come out and wedge between the packer and casing. Working surfaces are machined to a smooth finish and the slip-cones are hard chrome plated to protect against corrasion and to prevent slip seizure. *Oil Center Tool Co.*

IT'S NEW CHECK IT

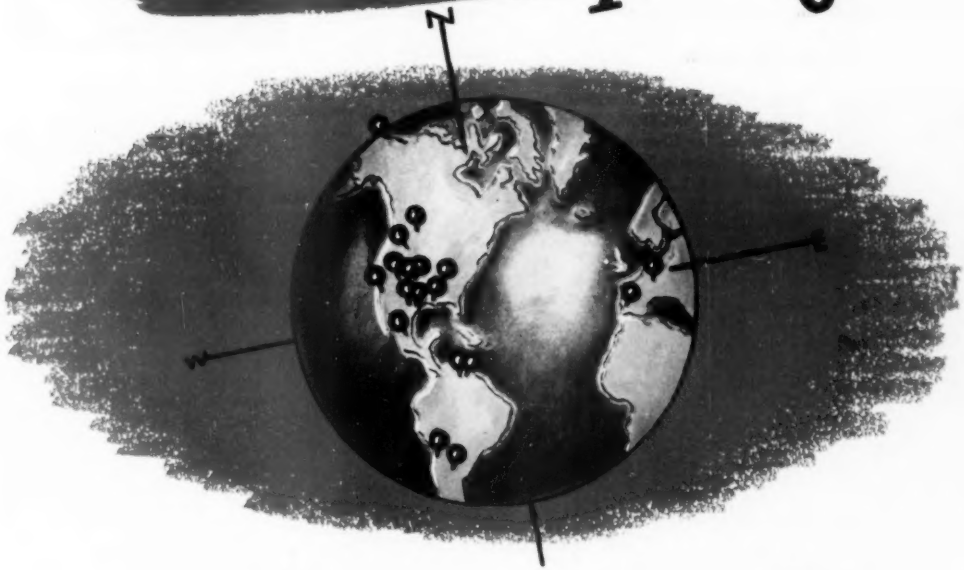
27 IMPROVED HEAVY TRACTOR. Air steering is standard equipment on this tractor. An over-center clutch runs across the whole width of the dashboard so

the operator can easily locate it without taking his eyes off the job. Other features include push-button electric starting with a cold-weather starting aid as standard equipment, center positioned gear-shift lever, parking brakes, throttle located at right arm rest, ample leg room, and comfortable, two-man upholstered seat. Tracks have been designed for maximum ground contact to give the tractor the greatest possible pulling power and more stability and balance for dozing. The "OC-18" has 126 rated horsepower. It can be operated efficiently in mud, rocks, or stumps because of unusually high clearance. *Oliver Corp.*

IT'S NEW CHECK IT

28 ISOPACK is a special bag packing for bitumen, tar products, resins, waxes, paraffin waxes, and many other materials with a dripping point of more than 122° F. Properly used the material is absolutely impervious. Isopack bags of suitable texture will stand a filling temperature of up to 481° F. Empty bags will not deteriorate in storage, and are reusable. Isopack bags offer a most

Wherever you go



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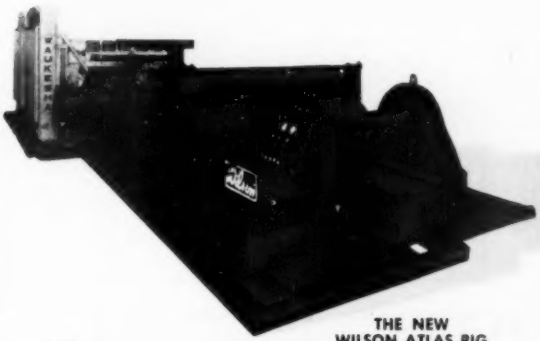

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10,000 ft. 4½" Drill Pipe
11,500 ft. 3½" Drill Pipe

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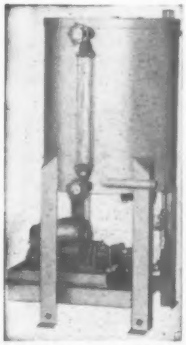
economic way for transport and saving of freight space. Any desired size is available. Isopack does not react chemically or otherwise with the filling material. *Bau-Export.*

IT'S NEW CHECK IT



29 PACKAGED CHEMICAL FEED SYSTEM. The unit consists of a 50-to-500-gal. carbon-steel chemical-solution tank mounted over a Milton Roy controlled volume pump. Piping is supplied for the suction line, complete with valves and sight gage for reading liquid level. Accessory equipment includes agitators, dissolving baskets, low-level alarm panel, and electrodes and relays. Controlled volume pumps are available in either simplex or duplex models, air-powered or motor-driven. They are manufactured in 10 types of metal, all designed for specific chemical services. Pump capacities range up to 300 gal. per hour, and operate against pressures up to 5,000 psi. *Milton Roy Co.*

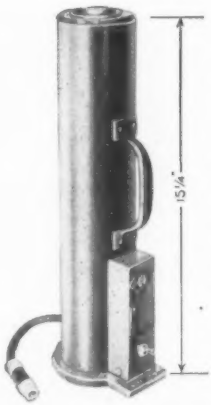
IT'S NEW CHECK IT

30 SPACE-SAVING MAP CABINET. There are no ragged lengths when the maps are filed. The 2 by 2-in. square compartments create a systematic and neat filing arrangement. Index system is clearly and instantly at finger-tips. The slide is pulled slightly out, and the map is there. When the map has served its purpose, it is rolled and quickly placed into its own compartment, where it is ready for instant reference when needed again. Exterior of cabinets is made of ¾-in., five-ply hardwood, with mitered lock joints. The sliding doors are banded on the edges with hardwood and individually locked and keyed. Cabinet sections, when placed upon base, will file 800 to 1,000 maps in 16 sq. ft. of floor space. *Port City Cabinet Works.*

IT'S NEW CHECK IT

31 NORTHAM FREQUENCY COMPUTER. This system is used for the continuous measurement of flow of difficult fluids. The primary element generates electrical pulses with a frequency proportional to the flow rate. It is operable with pulses as low as 1 millivolt in amplitude. Ranges of 5-100 cycles per second and higher with an accuracy of ±0.5 per cent full scale are available. An internal frequency reference is incorporated to provide over-all system standardization. All other controls have been eliminated. The computer can be made to measure directly the frequency of any source in the audio range; measurement of higher frequencies can be accomplished by using dividers. In addition to the flowmeter application, it may be used as a tachometer, with a photoelectric or magnetic pickoff; as a frequency deviation meter; or for any other applications where an accurate measure of frequency is desired. The output is a d.c. voltage suitable for use with indicating, controlling, and recording instruments. *North American Instruments, Inc.*

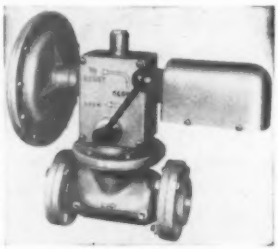
IT'S NEW CHECK IT



32 MELTON HEATING HYDROMETER CYLINDER is designed and built to meet the growing need of the petroleum industry for a hydrometer cylinder which will heat samples of waxy crudes so that hydrometers will float in these samples, thus assuring correct readings. The heat is thermostatically controlled and the thermostat can be set to the desired temperature according to conditions encountered. It is housed in strong, lightweight steel with full-sized insulated aluminum cylinder and bronze base. The inside dimensions conform to A.P.I. specifications. This heating hydrometer cylinder is furnished in two models; one for use with 6-volt d.c. current, the other for 110-volt a.c. *L-K Pump Valve Co.*

IT'S NEW CHECK IT

33 MANUAL-RESET SAFETY SHUTOFF VALVE, applicable for all types of gas-combustion systems, is flanged mounted for easy insertion and is light in weight. It is easily adapted to a number of safety control systems where gas pressure, air pressure, or electric power is the controlling medium. Valve may be used with any combination of gas, air, or electric power units or by any single unit. It is ideal for heaters, furnaces, boilers, and other gas line uses. Valve has FM approval and is available with motorized operator and micro-switch for operating signal when either flame failure or pressure failure occurs. *Southwest Industrial Heating Engineers.*



IT'S NEW CHECK IT

Standard Oil extends its greetings to the 32nd annual meeting of the American Petroleum Institute. While you're in Chicago, we suggest that you visit the interesting oil exhibit at the Museum of Science and Industry.

THREE YEARS in the making, the Petroleum Industry Exhibit occupies 8,300 square feet at the Museum of Science and Industry. It depicts the story of oil from well to final distribution. Admiring one section of the exhibit are Lorna Sullivan and Elizabeth Moran.

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This Socony Air-Lift Catalytic Cracking Unit will give you an outstanding combination of low investment, minimum operating costs, and highest yields of premium quality gasoline and burner oils.

The capacity of this Socony Air-Lift Catalytic Cracking Unit ranges from 1,500 barrels per day of fresh gas oil feed at 90% conversion to 3,000 barrels per day of fresh gas oil feed at 50% conversion. Standard units are available also for greater capacities.

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REFINING

Union Oil Co. Forms New Petrochemical Subsidiary

LOS ANGELES.—Union Oil Co. of California has decided to form a new subsidiary to develop, manufacture, and market chemicals from petroleum.

Reese H. Taylor, president of Union, said the company will be known as Brea Chemicals, Inc.

Homer Reed, formerly chief engineer for Union, will be president of the new petrochemical company. Headquarters temporarily will be at Union's research center in Brea, Calif.

Taylor said marketing activities and personnel of Union's byproducts chemical division will be transferred to the new organization.

Construction to Begin in January on Proven Refinery

FLORENCE, Ariz. — Proven Oil & Refining Co. will begin construction on its $18,000,000 refinery here about January 1, according to L. M. Glasco, president of the firm.

The projected refinery will have a processing capacity of about 15,000 bbl. of crude daily. It will manufacture automotive and aviation gasoline, kerosine, diesel fuel, asphalt, and other petroleum products. Ebasco Services, New York, has been awarded the general construction contract.

The new plant is a companion project to a 953-mile crude line from Texas fields to the Los Angeles Harbor area to be laid at an estimated cost of $100,000,000. The line will be laid and operated by West Coast Pipeline Co., Inc., also headed by Glasco.

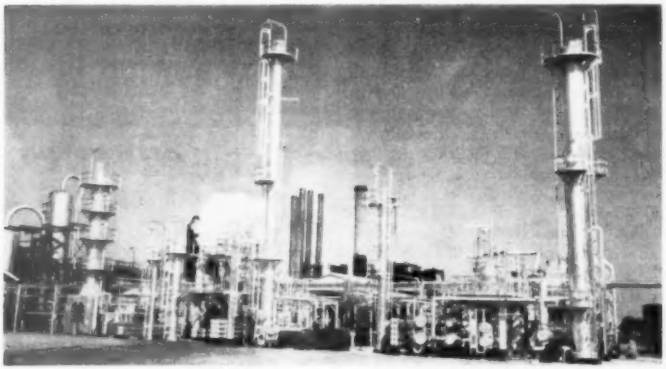
A.I.O.C. Licenses Kellogg To Build Autofining Units

NEW YORK. — M. W. Kellogg Company has been licensed by Anglo-Iranian Oil Co., Ltd., to design and construct catalytic desulfurization units operating on the Autofining process.

The new process, developed by A.I.O.C., is capable of removing 90 per cent of the sulfur in sour middle distillates without appreciable product loss. It has been submitted to several years of pilot plant operation, and now is used in two A.I.O.C. refineries in the United Kingdom. A semi-commercial 450-bbl. unit has been in operation at Grangemouth, Scotland, for several months, and a 3,500-bbl. unit recently was placed on stream at Llandarcy, Wales.

The new process can be used to treat jet fuels and is considered superior to sulfuric acid treating in that it affords substantially higher product yields and eliminates the problems attending acid shortage and sludge disposal.

According to A.I.O.C. initial investment cost for an Autofining unit would be appreciably less than for conventional desulfurization plants.



New Longview Unit

Skelly Oil Co. has just placed this 1,850-bbl. U. O. P. Platforming unit on stream at its Longview refinery. The new unit, plus a recently completed 90-bbl. gas-polymerization unit, is being used to improve octane numbers of the gasoline product at the 6,000-bbl. refinery. Both units were constructed by Procon, Inc.

GAGETRON Applied to Measurement of Catalyst Level
New industrial application of atomic energy employs radium and hydrogen tube. Catalyst level is measured by number of atomic impulses passing through the counter tube. The primary element is the GAGETRON.
The GAGETRON is manufactured under Graham Patent No. 2,565,963.
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The inexpensive catalyst requires regeneration once monthly under normal operating conditions, and a catalyst life of 5 years is indicated on the basis of operations to date. The process does not require outside hydrogen, since some net hydrogen production results from dehydrogenation of feed stocks.

Desulfurization of sour feed stocks for gasoline production also can be accomplished by Autofining. Its potential importance in jet-fuel production is visualized as growing demand requires refiners to turn more and more to sulfur stocks for blending to future jet-fuel requirements.

Esso Renews Option on Site For Refinery in Virginia

NEW YORK.—Esso Standard Oil Co. has renewed its options for another 90 days on an 800-acre tract in Norfolk County, Virginia, where it is considering construction of a refinery.

An Esso official said it is likely that a decision will be made whether or not to build simultaneously with planning the company's construction and expansion budget for 1953.

If Esso goes ahead with construction of the plant, it will be the first refinery in Virginia.

The acreage is on the Elizabeth River between West Norfolk and the U. S. Navy's oil terminal at Craney Island. It is served by the Atlantic & Danville Railroad.

A.C.S. Petroleum Division Schedules Three Symposia

LOS ANGELES. — Waste disposal, pilot plants, and petrochemicals will share attention of the Petroleum Division of American Chemical Society at its spring meeting here March 15-20, 1953. Three symposia are planned.

Industrial waste-disposal problems of the petroleum industry will be covered in a symposium to be cosponsored with the Division of Water, Sewage, and Sanitation Chemistry. Cochairmen from the two divisions will be Dr. Roy Weston, Atlantic Refining Co., Philadelphia, and Dr. Roy Giles, Standard Oil Co. (Ind.), Chicago. Dr. C. L. Brown of Standard Oil Development Co., New York, will head another symposium on the design and operation of pilot plants, which will feature a panel-type discussion on the subject.

Together with the Division of Chemical Literature, the Petroleum Division will conduct a symposium on the literature of chemicals derived from petroleum, to be headed by the secretary of the literature division, Miss Charlotte Schaler, Sinclair Refining Co., New York.

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PIPE LINES

Platte Welds Final Section Of 1,100-Mile Crude Line

DENVER. — Platte Pipe Line Co., Kansas City, welded the last section of its 1,100-mile crude pipe line last week near Holdredge, Neb.

The 20 and 16-in. trunk line runs from the Big Horn basin of Wyoming to Wood River, Ill.

The line will be tested for about 2 weeks before crude is started flowing through it at the initial rate of 100,000 bbl. daily.

Operation of the Platte line will mark the first time that Rocky Mountain crude can be delivered to the refining centers of the Midwest at a price competitive with Texas and Mid-Continent oil.

Conoco to Lay Product Line From Billings to Spokane

PONCA CITY, Okla.—Continental Pipe Line Co. will start construction of a 600-mile, 8-in. products pipe line from Billings, Mont., to Spokane as soon as government approval can be secured for pipe and materials and certain negotiations can be completed.

W. L. Kygar, president of the company which is an affiliate of Continental Oil Co., said the line probably will be named the Yellowstone Pipe Line.

It will have an initial capacity of 25,000 bbl. of products daily.

Kygar said the line will run from Billings west to Bozeman, Helena, and Missoula, Mont., and across northern Idaho to Spokane. Terminals will serve the western part of Montana, parts of Idaho, and eastern Washington.

Transco Completes Gas Line Across Narrows to New York

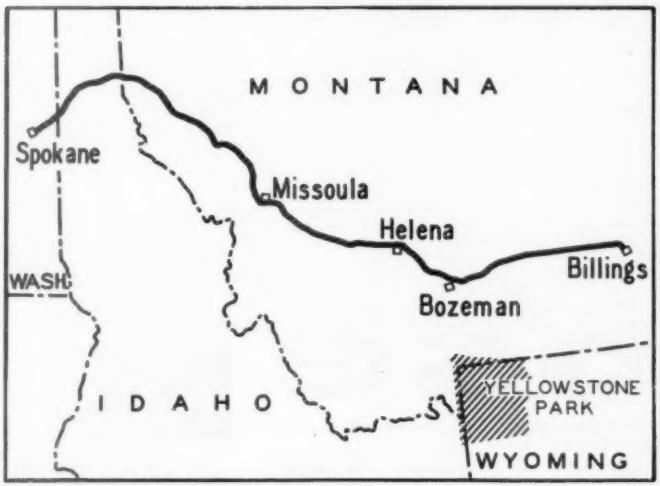
NEW YORK.—Transcontinental Gas Pipe Line Corp. has placed its second natural-gas line into this city in service.

Completion of the line was set back considerably when the line was damaged at the Narrows crossing of New York Harbor by a ship's dragging anchor before the trench could be backfilled.

The 24-in. line enters Brooklyn from Linden, N. J., crossing Staten Island and the Narrows. Transco's other line into New York crosses the Hudson River at 134th Street.

To repair the line, divers had to cut it near the damaged portion, and attach pontoons to lighten the load. Four derrick barges hauled up the severed ends, and a new section was welded into the line, X-rayed, and coated. The line then was lowered into the trench, tested, and filled with gas. Backfilling now has progressed sufficiently so that no more damage is believed probable.

Meritt-Chapman & Scott handled the repair job under the direction of Transco engineers.



YELLOWSTONE PIPE LINE will follow this general route to Spokane.

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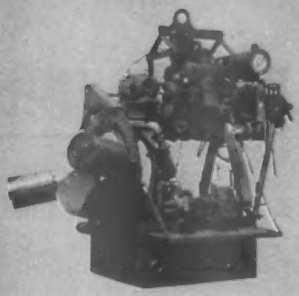
- Crose Endless Pipe Belt Slings
- Crose Pipeline Cradles
- Crose Portable Electric Generators
- Crose Portable Buffing Unit

CROSE
CLEANING & PRIMING MACHINE

Line traveling, rugged and dependable, equipped with dual multi-speed transmissions providing greater flexibility of control. Interchangeable cleaning and priming assemblies permit each model to process a wide range of pipe sizes. Model M handles 3"-14" pipe, Model K handles 16"-26" pipe, Model R handles 30"-31" pipe.



CROSE
COATING & WRAPPING MACHINE

Spray ring assures positive and uniform coating of pipe, coats high welds, wrinkle bends and egged pipe. Built-in strainer prevents foreign particles from getting to pipe surface. Precision-built paper brakes are adjustable to permit perfect tension of wrapper. Available for all sizes of pipe.

INDISPENSABLE TO BETTER PIPELINING

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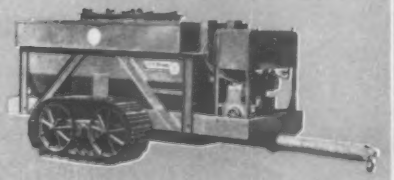
PIPELINE KETTLES

No other kettle can offer so many features . . . fully insulated, perfect circulation of heat. Uniform heating of entire inside tank surface, eliminating hot spots. Agitator is hydraulically operated to keep all filler in suspension with a reciprocating motion. Prevents coking. Unit skid mounted or on Athey tracks. Available in 10, 23, or 30 barrel capacities.



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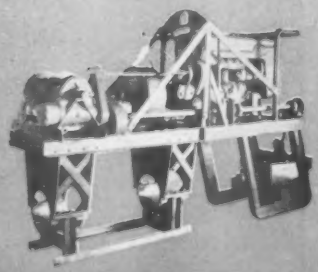
ROAD BORING MACHINE

The fastest and most economical method of boring crossings where rock is not encountered. Installs casing as boring progresses—eliminates cave-ins. Absolutely prevents settling of concrete slab highways or railroad beds. Extremely accurate in alignment. Adaptable to all sizes of casing from 3" to 34".



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Manufacturing Company, Inc.

SPECIALIZED EQUIPMENT FOR THE PIPELINE INDUSTRY

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BRANCH OFFICES IN HOUSTON, SAN FRANCISCO • EXPORT OFFICE, NEW YORK CITY

Expansion O.K.'d

Northern to hike capacity 225,000,000 cu. ft. daily

WASHINGTON.—Northern Natural Gas Co., Omaha, through amendment of an order issued by the Federal Power Commission in June, has permission to go ahead with expansion of capacity of its system from 600,000,000 cu. ft. daily to 825,000,000 cu. ft.

The FPC action followed a rehearing held last month, at the request of Northern, on certain conditions in the June 24 order relating to the requirement that all the natural-gas reserves which Northern controls must be firmly committed to the increased service as long as gas could be economically produced from the reserves. It provided, however, that this would not prevent the normal trading of individual leases or wells solely for the purpose of obtaining more economic production units.

As now amended, the order is modified to require that Northern shall not, without prior FPC approval, alienate, sell, or transfer the natural-gas reserves as long as natural gas may be economically produced therefrom for rendition of the service authorized by the June 24 order.

Conditions eased . . . The commission specified that the condition as amended will not prevent the normal abandonment or trading of leases or wells for the purpose of improving Northern's gas-reserve position or for obtaining more-economic or more-efficient gas-production operations. The amendment provides that Northern shall obtain prior FPC approval only when it wishes to undertake a specific transaction affecting its reserves, in form and nature substantially different from the pattern established by its prior operations.

The commission said that the conditions, as amended, will provide Northern with an adequate flexibility of operations and at the same time assure the continued availability of the necessary gas supply.

New Pipe-Line Contracting Company Formed in Tulsa

TULSA.—Lee Vaughan, formerly a partner in the Vaughan and Russell D. May pipe-line contracting company, has announced the formation of Engineering Construction Co., Tulsa.

The company is headquartered at 402 North Cheyenne, Tulsa. It has two fully equipped and staffed spreads and

CLEANER PIPELINES CO.
1900 Armour Rd. No. K. C. 16, Mo.

EFFICIENT cleaning pays off in increased gas volume.

INTERNAL PIPELINE CLEANING EQUIPMENT:

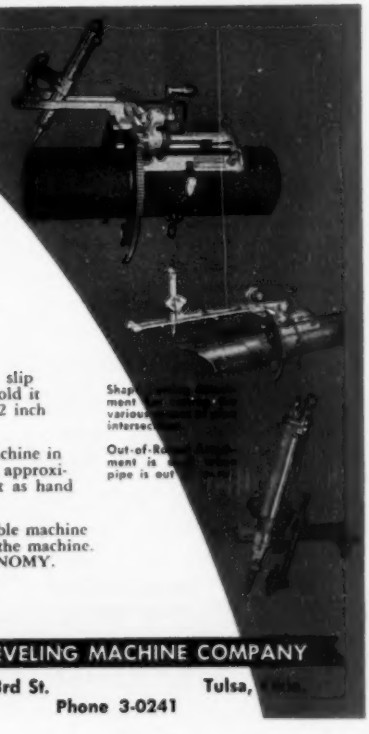
EXPANSIBLE CLEANERS
SPRING LOADED CLEANERS
FLEXIBLE SPIRAL BRUSHES
SQUEEGEES

PIPELINE ACCESSORIES:

NIGHT CAPS
TIPTON PIPE CLAMPS
PIPE HOOKS AND TONGS
O.D. WINDMASTERS
TIPTON HI-PR PATCHES
BEVELING MACHINES
PIPESHINER BRUSHES
PIPE DOLLYS
RUBBER SCRAPER CUPS

ALL ITEMS IN STOCK
(WRITE FOR CATALOG)

H&M
PIPE CUTTING AND BEVELING MACHINE
Cuts and Bevels Pipe FASTER, MORE ECONOMICALLY



Split horseshoe shaped gear permits machine to slip quickly over pipe. Fast operating snap chain fasteners hold it in place. A complete cut and bevel can be made in a 12 inch pipe in about two minutes.

You'll soon save several times the cost of the machine in labor, gas and transportation charges. H&M takes approximately one-half the labor and gas to make the cut as hand cutting and the work is all done in the field.

Bring this light (24 to 155 pounds) but durable machine to the pipe instead of moving the heavy pipe to the machine. Remember, H&M designs for SPEED and ECONOMY.

See for yourself. Let us arrange a demonstration.

H&M PIPE BEVELING MACHINE COMPANY
311 E. 3rd St. Tulsa, Okla.
Phone 3-0241
Trade Mark Reg. U. S. Pat. Off.

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in PIPELINE PROTECTION

VITRON Reinforcing WRAP

Pulls into hot coatings, minimizes holidays and provides permanent high strength reinforcing that's unaffected by moisture and soil acids.

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Made from an asphalt and tar compound, reinforced with glass fiber mat and yarn—provides a tough "hide" to protect coatings against handling, backfill and soil stress.

Write for information on protection for your pipelines. Glass Fibers Inc., 1810 Madison Avenue, Toledo 2, Ohio.

Vitron® UNDERGROUND PIPE WRAPS

GLASS FIBERS INC.

Makers of glass fibers by the ELECTRONIC-EXTRUSION process . . . developed, patented and used exclusively by Glass Fibers Inc.

at present is working on the Colorado Interstate line out of Keys, Okla., the Cooperative Refinery Association line near Phillipsburg, Kans., and on a Mid-south Gas Co. project in Arkansas.

Officers of the Nevada-incorporated firm are: Lee Vaughan, president; Curt Vaughan, vice president H. H. Griffin, vice president and secretary; Eugene Monnet, assistant secretary and assistant treasurer; and John E. Baker, assistant secretary and treasurer.

Southern California Firms Launch Expansion Program

LOS ANGELES.—Southern Counties Gas Co. and Southern California Gas Co. have let contracts for initial work on a $5,000,000 expansion of their jointly owned California section of the big natural-gas trunk line from Texas.

Contracts have been let to J. B. Gill Co. of Long Beach, for concrete work on two compressor stations at Desert Center, halfway between Blythe and Indio, and at Cactus City, about 20 miles east of Indio.

Spokesmen for the companies said bids for construction of loop lines will be accepted this week, and actual laying operations will begin about the first of December.

The looping program in southern California is part of a $127,000,000 construction program approved by the Federal Power Commission last July. It involves laying loop lines and installing compressor additions necessary to bring another 300,000,000 cu. ft. of gas daily into California—half to the southern companies, and half to Pacific Gas & Electric Co., San Francisco.

El Paso Natural Gas Co. will spend more than $108,500,000 to carry this gas from the Permian basin of West Texas and the San Juan basin of New Mexico to the California border. P. G. & E. will spend approximately $13,500,000 on its portion of the program.

Texas-New Mexico Lets Contract for New Crude Line

HOUSTON. — Texas-New Mexico Pipe Line Co. has awarded contract to Panama-Williams Co., Houston, for the construction of approximately 22 miles of 12¾-in. crude-oil pipe line in West Texas.

The line will connect the Crane pump station, Crane County, with Rancho Pipe Line System's Mesa station at McCamey.

Work is to be started within a week.

DITCHIN' FOR A 30 INCHER

IT'S NO PROBLEM OKLAHOMA'S on the JOB!

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On the Job
Since 1915

IT'S AN OK JOB IF IT'S DONE BY
OKlahoma
CONTRACTING CO.

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KAMLOK
COUPLING ASSEMBLIES

The Fastest, Surest Coupling Known

KAMLOK Couplings combine *speed, perfect performance, durability*—three features that are indispensable. *Fastest!* Perfectly tight, safe connection *in seconds*, by sliding coupler over adaptor, and pressing cam levers. KAMLOKS couple and uncouple *instantly*, regardless of "hookup." *Efficient!* No wasted *time—effort*, achieving leakproof-tight connection that guarantees consistently safe operation at peak efficiency. *Long-lasting!* Made of hard wear-resistant bronze to 3", 4" size of OPALUMIN, as strong as bronze, only ⅓ the weight. KAMLOKS add extra life to hose.

Write for Bulletin F-3

OPW CORPORATION

VALVES, FITTINGS, ASSEMBLIES
for handling hazardous liquids
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No Time Wasted!

WHEN WORKERS WEAR

STASAFE WINDSOCKS

The Safety Hat Liners That Need No Installation

9" length $2.64 Doz.
11" length $3.00 Doz.

Windsock is a throw-away type head covering that's easy to use. Inexpensive—it actually costs less than the *time alone* spent by a worker in installing or in removing a permanent type liner. Warm and snug-fitting, Windsock puts an end to chilly winter drafts.

Write for descriptive Bulletin No. 567

STANDARD SAFETY EQUIPMENT COMPANY

232 West Ontario St. Chicago 10, Ill.

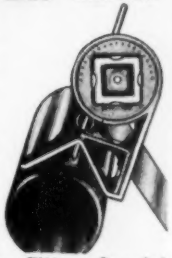
PIPE WORK MADE EASY

with these Proven, Practical Tools

You get back your investment on one or two jobs!

CENTER FINDER PROTRACTOR
Model CR-3M

For fast, accurate pipe layouts "on the job". With the "CENTER-FINDER", a layout man can mark 4 *equi-distant points* on the circumference of a pipe of *any size* at *any degree at the same time*. . Serves as a 360° *protractor* . . . Has 0°-90°-0° *scale* together with a double-reading of 1/2"-*per-foot-pitch scale*. Has SIX 1"x5/16" level vials, and a 1"x9" blade.



MODEL CR-3M "Center Finder" Protractor **$32.75**

CENTER FINDER – Pipe Fitters Special

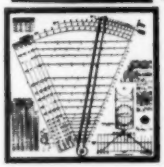
This is similar to the Model CR shown above, except that it has *NO BLADE*. More compact, gets into tight places. Has scale on ONE SIDE only. Six level vials.

MODEL PF-3M, Pipe Fitters Special **$31.25**

"ANGLE METER"
For Pipe Bends up to 126°

GIVES INSTANT TEMPLETS

Direct Readings on to pipe or sheet metal. No calculations required!



The only device of its kind! The Wolfe "ANGLE METER" is the only DIRECT, "ON-THE-JOB" device for making templets or laying out directly on Pipe or Sheet Metal, for Bends up to 126° any diameter pipe. Makes "Y" Layouts; Multi-piece Bends of any number of pieces and degree, any Throat, any Diameter, and gives Starting Line to Rise of Angle Cut; makes Roof-jacks, Angle Iron layouts, etc. Used in leading plants. Angle Meter is 12"x12" overall, sturdy. FLAT model for shop; FOLDING MODEL for field. Specify which.

PRICE: $7.50 each. Instructive Folder included.

MECHANIC'S PROTRACTOR

SPEEDS CONSTRUCTION, LAYOUT, CHECKING WORK

Solves angle measuring problems "on the job." Exclusive features:—One setting gives readings for Inside Angle (A), Outside Angle (B) and inches-per-foot against degrees. Made of Vinylite plastic. Non-burning, non-greasing. Pocket size. Light, strong $2.50 each

We pay postage if payment comes with order. Otherwise F.O.B. N.Y.C....Catalog available.

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STRONGER

way to make a bit,
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H. C. Smith bits also feature cutter teeth hardfaced with diamond metal, bodies heat-treated for maximum strength, precision cut tool-joint threads. These are some of the reasons why many operators prefer H. C. Smith bits for faster drilling with straight, full gauge hole.

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OIL TOOL CO.
GENERAL OFFICES, EXPORT OFFICE AND PLANT
COMPTON, CALIFORNIA

BRANCHES IN ALL PRINCIPAL OIL CENTERS IN THE UNITED STATES AND CANADA

Among the

Drilling Contractors

Two Contractors Drilling In New Mississippi Pool

Two contractors now are working in the newly opened Locust Hill field in eastern Adams County, Mississippi. Kemp Drilling Co., Shreveport, has moved in a rig with a contract from Magnolia Petroleum Co. for a north offset to the discovery well, drilled by Dorris Ballew, Inc., Natchez, Miss., for John S. Callon and B. F. Pace. Ballew's rig is on the east offset to the discovery well being drilled for the latter operators. Kemp's well is 1 Central in 77-6n-1w. Ballew's is 1 U.S.A., in 12-5n-1e.

Kemp also has a contract with Magnolia Petroleum Co. for a north offset to that company's recently completed discovery well of the North Kingston field in the same county. This new job is 2 Pace, with location in 12-5n-2w. All are Wilcox sand wells with pay at depths of 7,000 ft.

The latter contractor also has taken on two deep drilling jobs in other areas, one a 10,000-ft. Tuscaloosa test, for George and Frank Frankel Co. at 1 Thomas, ½ mile southeast of production in the Ross Bayou field, Concordia Parish, Louisiana, and the other, a 13,500-ft. wildcat, for Texas Pacific Coal & Oil Co. at 1 Day, 6 miles northwest of Greenburg, in St. Helena Parish, Louisiana.

New Contracting Firm

Bert Sager, drilling superintendent, Brinkerhoff Drilling Co., Casper, Wyo., has joined J. V. Dunbar, Dunbar Drilling Co., Denver and Salem, Ill., in the formation of a new drilling contracting partnership. The new firm's headquarters are located in the Patterson Building, Denver.

Rocky Mountain Drillers Pick Miller as Chairman

C. A. Miller, Casper, Wyo., drilling superintendent, Rocky Mountain district, Kerr-McGee Oil Industries, Inc., Oklahoma City, is the newly elected chairman of the Rocky Mountain chapter, American Oilwell Drilling Contractors Association.

Other new officers are Dave True, True & Brown, Casper, vice chairman; Barney Oldham, R. L. Manning Co., Denver, secretary; and Douglas Brown, True & Brown, treasurer.

Owen H. Rives, Holdenville, Okla., is drilling on a contract with K. A. Ellison of Oklahoma City at a wildcat location 3 miles north of Merrick, Lincoln County, Oklahoma. The new wildcat, 1 Davidson, in the SW SE SW 21-17n-2e, is 1½ miles north of production in the North Merrick pool.

Petersen Drilling Co., Shreveport, is drilling for Midstates Oil Corp. at a new operation in the South White Apple field, western Frankin County, Mississippi. It is 1 Central, a 6,700-ft. Wilcox test, with location in 3-5n-1e.

J. F. Crow Well Servicing Co., Brookhaven, Miss., has moved a rotary rig from the Gilberton area, Choctaw County, Alabama, to a wildcat location in Covington County, same state, for a wildcat test to be drilled for Wal-

On location at a well recently drilled by Goldsmith & Perkins, Duncan, Okla., contracting firm, in the Duncan area, Stephens County, Oklahoma. Left to right: O. W. Coon, driller; Donald Deen and Clyde Ackins, crew members; Roland Goldsmith, partner in the firm; and Gene Dixon, field engineer, Mud Products, Inc.

You will pull fewer drill strings because of joint failure if you use 'Bestolife Lead Seal Tool Joint and Casing Compound. Standard of the oil industry for 20 years. Unconditionally guaranteed. Sold and exported by supply houses throughout the world.

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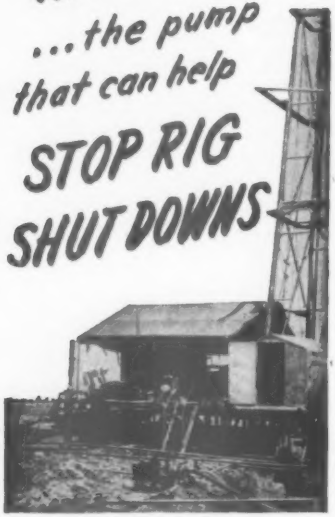
Get Constant Pressure With an INFERNO Firing Control . . .

The INFERNO Firing Control holds a constant pressure in the boiler—and saves drilling time, too! The Inferno Firing Control means pressure how you want it—when you want it! Write for free copy of Bulletin 8-B.

The INFERNO CO.
Box 1138A
115 RICOU St.
SHREVEPORT, LA.

Marlow "MUD HOG" ...the pump that can help STOP RIG SHUT DOWNS

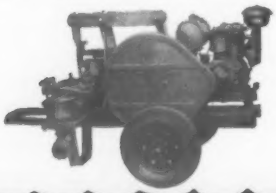


With this famous diaphragm pump on the job you don't need to shut down your rig to clean cuttings from pits, mix muds or pump water. What's more, your slush pump is free to stay on its profit-producing job — circulating drilling mud.

At your rig a Marlow "Mud Hog" can:

Eliminate jets to clean pits
Reduce costly drilling-mud loss to waste pit
Cut down water loss to waste pit
Mix mud and feed slush pump directly . . . eliminate unused mud at slush pump suction
Transfer water from waste pit
Supply water at low pressure

A Marlow "Mud Hog" is the unrivalled "tough baby" of the oil country. Write for complete details about this dependable money-saving pump.



MARLOW PUMPS
544 GREENWOOD AVENUE
RIDGEWOOD, NEW JERSEY
Engineers and Representatives Everywhere

lace R. Gunn, Earl Wilson, and J. F. Crow (owner of the contracting company). The test, 1 Ramer, C SW SW 25-5n-18e, will be carried to 4,000 ft.

Big West Drilling Co., Dallas, has moved a rotary rig to a wildcat location 12 miles northwest of Keota, Weld County, Colorado, where it is under con.ract for a test to be drilled for James H. Snowden at 1 State. Location is in the C NE NE 33-11n-62w.

Don Rounds is the contractor on a Dakota test which Midwest Oil Corp. is starting at 1 Uhl and associa.es, in the NW NW NW 22-11n-56w, 10 miles north of Pawnee Creek, in Weld County, Colorado.

Mohawk Drilling Co., Oklahoma City, has a new operation under way for Jay Simmons of Dallas in the active development play under way east of the fault along the east flank of the Oklahoma City field, in Oklahoma County, Oklahoma. The new test is 1 Chapman with location in the SW NW SW 7-11n-2w. Contract is for 6,500 ft.

Linney Drilling Co. is the contractor on the wildcat test being started by K. D. Owen at 1 Government, in the NE SW NE 23-22s-5eSLM, 39 miles northeast of Richfield, in Sevier County, Utah.

Atkins & Pannell Drilling Co., Shreveport, La., is drilling on a contract with Anthony Oil Co. at a wildcat location in the Lewisville area in

New heavy-duty power rig being operated by Grey-Wolfe Drilling Co., Houston, in the Eagle Lake area of Colorado County, Texas Gulf Coast, under contract to Fidelity Oil & Royalty Co. Insert is H. O. Gibson, tool pusher.

THE SURE WAY TO PREVENT ENGINE "BURN-OUT"

Install MURPHY Safety Switches on all your oil field engines. These switches shut down engine AUTOMATICALLY when oil pressure gets low or water temperature gets too hot. Thousands of these switches now in use.

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FRANK W. MURPHY *Manufacturer*
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Standco NO-SMOKE
STANDCO BRAKE LINING
Nothing novel—no bunk, but it gets the job done without scoring brake rims. See pages 3608-3613, Composite Catalog.
Standco Brake Lining Co.
HOUSTON

IN STOCK READY TO ASSEMBLE!
SCOTT-RICE STEEL WAREHOUSE SHELVING

Adjustable to convert to any need with bolts. Shelves adjustable on 1 inch centers. Available with backs and doors. Finished in Baked Enamell Shipped from stock.
STEEL LOCKERS ALSO IN STOCK
SCOTT-RICE COMPANY
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SUPERLON Plastic Line Pipe

● **Gives Greater Service**
NON-CORROSIVE . . . not affected by mineral deposits . . . entire system of pipe line is possible using plastic connections.

● **More Convenient to Use**
Not affected by low temperatures—use above or below ground . . . no special equipment to install . . . weighs about 1/12th of steel pipe.

● **More Economical**
Saves labor costs . . . saves storage space . . . saves transportation costs . . . saves on make-up time . . . saves on stringing time . . . saves on salvage costs.

● **Standard Pipe Sizes & Fittings**

● **Standard Wall Thicknesses**

● **Superlon Pipe has many uses**

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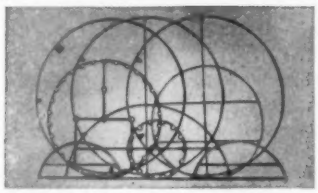
SUPERIOR PLASTICS, INC. DEPT. P
410-430 N. Oakley Blvd., Chicago 12, Ill.

Need GASKETS for HEAT EXCHANGERS?



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Here is a dependable source for gaskets for heat exchangers. These gaskets can be made in any size or shape as needed—cut from solid metal, sheet-packing; also double jacket type.

Send specifications, blue prints or templates, for quotation and a prompt-delivery schedule for normal stocking orders.

CHICAGO-WILCOX MFG. CO.
7703 Avalon Avenue, Chicago 19, Ill.
Phone: SAginaw 1-1900

Lafayette County, Arkansas. Location of the test, 1 Ward, in the C W½ SE SE 15-16s-24w, is 1¼ miles southeast of the West Lewisville field and a mile northwest of the old Lewisville field. Hole, contracted to 3,800 ft., will test the lower Glen Rose.

Davenport Drilling Co., Duncan, Okla., has contracted for a 3,500-ft. wildcat test to be drilled 3½ miles northwest of the Nellie townsite in Comanche County, southwestern Oklahoma. Operator is William H. Atkinson. The test, 1 Coody, is spotted in the NW NW NW 21-2n-9w, which is about 1¼ miles from production.

Novak Drilling Co. is contractor on a new test which Frank B. Murta & Son have started at a semiwildcat location ¼ mile west of production in the southeastern portion of the Stroud district in Creek County, Oklahoma. Location is at 1 Chapman, in the C NE NE 21-14n-7e.

J. B. Fletcher Drilling Co., Shreveport, is drilling an important wildcat test for Continental Oil Co. in Attala County, Mississippi. It is a Knox dolomite test, 1 Sudduth, located in the C SW NW 28-13n-6e. B. O. Red is Fletcher's tool pusher on the job.

George Acuff Drilling Co., Casper, Wyo., has the contract for a wildcat test which Western Empire Oil Co. is starting at 1 Government, in the South Little Sand Draw area, about 2 miles southeast of Waugh Dome, in Freemont County, Wyoming.

R. A. Whitehurst, El Dorado, Ark., has a rig on a 3,800-ft. wildcat test being drilled for Kirby Petroleum Co. in the Calion area, Union County, Arkansas. Location is 2¾ miles west of town in 18-16s-14w. Test is 1 Southern.

ACTIVE ROTARY RIGS*
(United States and Western Canada)

Area—	Week ended 11-3-52	Change week ended 10-27-52	Change week ended 11-5-51
Gulf Coast	590	+22	− 56
N. & W. Tex.-N. M.	794	+10	−251
Ark.-N. La.-E. Tex.	153	0	− 35
Oklahoma	330	+14	+ 19
Kansas-S. Nebraska	159	−18	− 36
Illinois-Eastern	146	+ 5	− 20
Rocky Mountains	250	−10	+ 54
Pacific Coast	170	0	− 1
Total U. S.	2,592	+23	−326
Western Canada	176	− 8	+ 24
Total	2,768	+15	−302

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States and the Pacific Coast and Illinois-Eastern areas are shown on pages 212 and 213.

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AN ESTATE — HOME — RANCH — HOTEL RESORT

One of the beautiful views in America for a country home, ranch, hotel resort, about 15 minutes SE of and overlooking Denver, Cherry Creek Dam and Reservoir. View of 300 miles of snow capped ranges. Natural trees, ravines, springs, hills, valleys, wild deer. North extension of Black Forest. Delightful in summer — dreamland in winter — wonderful climate in all seasons. Owner is building on adjoining tract. Purchaser must make high class improvements. 160 to 1280 acres for sale, price reasonable. Further details furnished.

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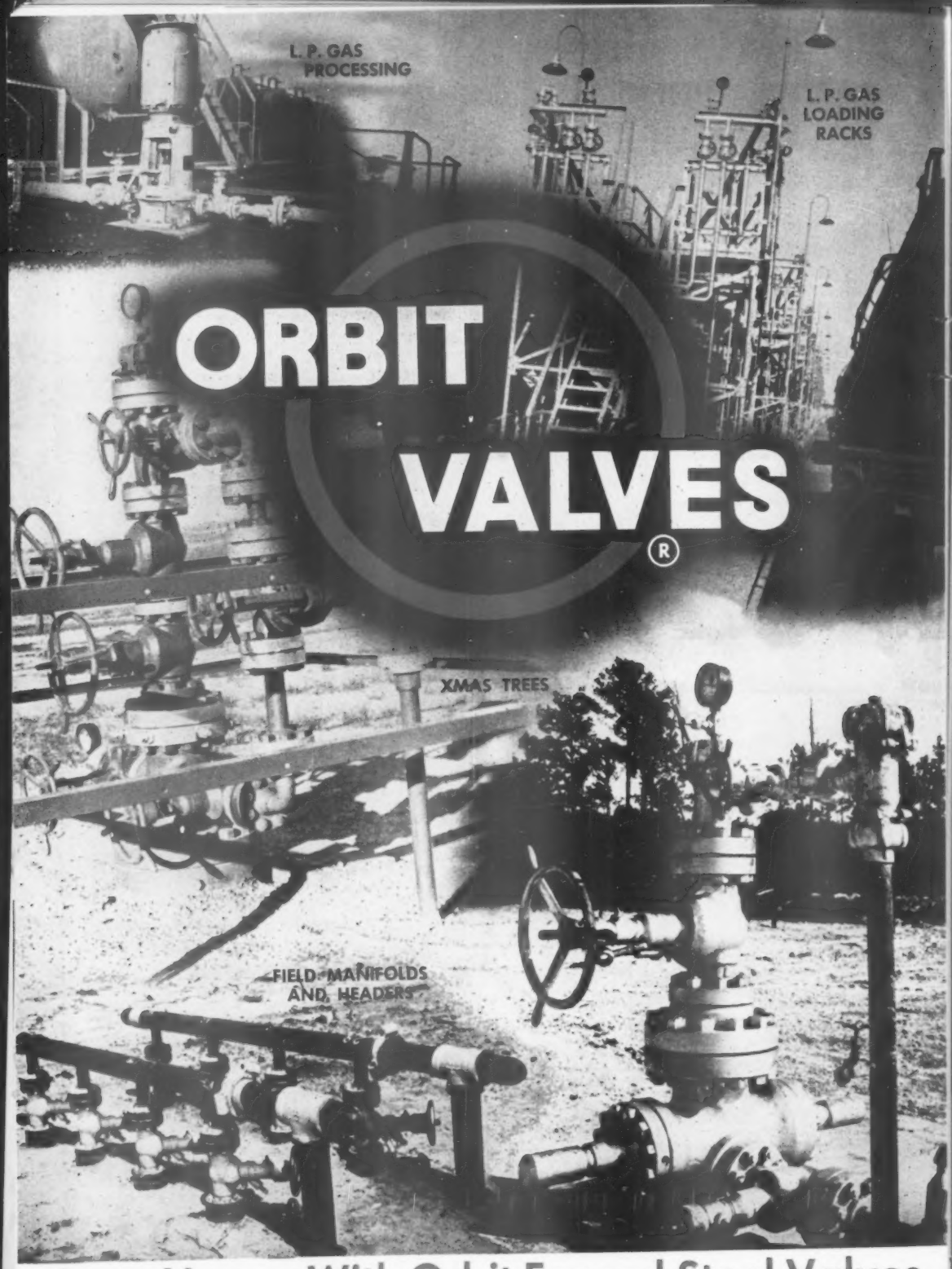


Save Money With Orbit Forged Steel Valves

NATURAL GAS

New Hearing Set

FPC forced back into New England gas-company fight

WASHINGTON.—The Federal Power Commission refused last week to issue a temporary certificate authorizing Algonquin Gas Transmission Co. to begin operation of its New England natural-gas pipe line system—now almost completed.

At the same time, in accordance with mandates issued by the Third Circuit Court of Appeals, FPC announced that it will hold hearings here November 24 reopening the proceedings involving gas service to New England.

The appeals court ruled that Northeastern's application to serve the same area in New England as Algonquin (about one-half of a four-state area) had not been properly considered by FPC and ordered a rehearing. By refusing to review the appeals court's decision, the U. S. Supreme Court threw the whole matter back in FPC's lap *(The Oil and Gas Journal, October 20, page 88)*.

The FPC rehearing will determine whether Algonquin or Northeastern shall be allowed to serve the area which the commission originally granted to Algonquin and through which the latter's nearly completed pipe-line system runs.

Delay costly . . . Officials of Algonquin told the commission late in October that unless the firm were allowed to place its new system in service, costs of the delay would average about $32,000 daily. In the event the company is unable to keep a construction crew on hand, officials said, it would cost about $300,000 to move material, equipment, and men out and back in.

The commission acknowledged that there would be "an adverse economic impact" on Algonquin and most of its prospective customers if the temporary certificate were not issued. It stated, however, that after a careful review of the Natural Gas Act in regard to issuance of temporary certificates, it had decided that it lacked the power to take such action in this case.

OPS Expects to Issue Order On Escalation Clauses Soon

WASHINGTON.—A spokesman for the Office of Price Administration last week said the agency expects to issue very soon its order concerning escalation clauses in gas-purchase contracts.

The agency apparently has retreated from a previously reported plan to ban outright any such escalation of gas prices. The OPS spokesman said that the agency would permit piercing of area ceilings by gas under contracts with escalation clauses but would not permit use of that escalated price if the "in lining" would result in a higher price than the present area ceiling.

The order is to be issued as an amendment to CPR 17. It would permit escalation clauses to become operative only if the contract were negotiated before January 25, 1951.

Texas Gas Flaring in July Cut Almost 30 Per Cent

AUSTIN.—The Texas Railroad Commission credits its tougher policy toward gas flaring during the past year with slashing gas flaring in Texas almost 30 per cent in July over that vented in July 1951.

Figures for July, just released by the commission, show that only 3.85 billion cubic feet was flared of a total production of 397.2 billion cubic feet (up 5 per cent).

Marketed production during the month gained more than 7 per cent over last year to 329.8 billion cubic feet.

Transmission lines took the lion's share of the output, 243.6 billion cubic feet, with about 158.8 billion cubic feet of this amount taken out of the state.

The remainder of the gas produced was accounted for under the extraction-loss, plant fuel and lease use, gas lift, pressure maintenance and repressuring, cycling, and carbon black categories.

Hearing on Higher Minimum Price in Hugoton Recessed

TOPEKA.—Hearings on an application of the Southwest Kansas Royalty Owners Association for higher prices for gas in Hugoton field have been recessed by the Kansas Corporation Commission until December 15.

The commission said the December hearing would be the last. A decision on the case is expected in January.

The royalty owners will complete presentation of their case when the hearing reconvenes. Protesting cities, individuals, and distributing companies then will testify, followed by cross examination.

The higher minimum price sought by royalty owners is 14 cents per M.c.f. at 16.4 psi. pressure or 12 cents at 14.65 psi. The present minimum is 8 cents at 16.4 psi.

So far 72 cities have protested the increases, and the mayor of Topeka, W. Kenneth Wilke, said he had invited 90 more first and second-class cities to send officials here to organize the case opposing the boosted price.

Royalty holders have argued that existing inequities in contracts from section to section in Hugoton should be wiped out.

Testifying for the owners, J. M. Wanenmacher, of Keplinger & Wanenmacher Petroleum Engineers, Tulsa, told the commission that at the present rate of depletion, Hugoton field would last about 40 years. Production, he said, was 336,566,000 M.c.f. during the 12 months ended in September.

Natural Gasoline

Del Rey Completes Expansion Of Eagle Lake Installation

HOUSTON.—Del Rey Petroleum Co. recently completed an expansion of its Eagle Lake, Tex., natural-gasoline plant which will almost double plant capacity.

Gas-processing capacity has been increased from 50,000,000 cu. ft. daily to a new total of 90,000,000 cu. ft. daily. New units and equipment added during the program include an absorber, cooling tower, oil pump, refrigeration equipment, oil heater, and a demethanizing column.

Products output has been increased from the old total of 56,000 gal. daily to 72,000 gal. per day.

Now on order are a new depropanizer, which, when installed, will further increase plant production to 90,000 gal. daily. The new units are scheduled to arrive in December.

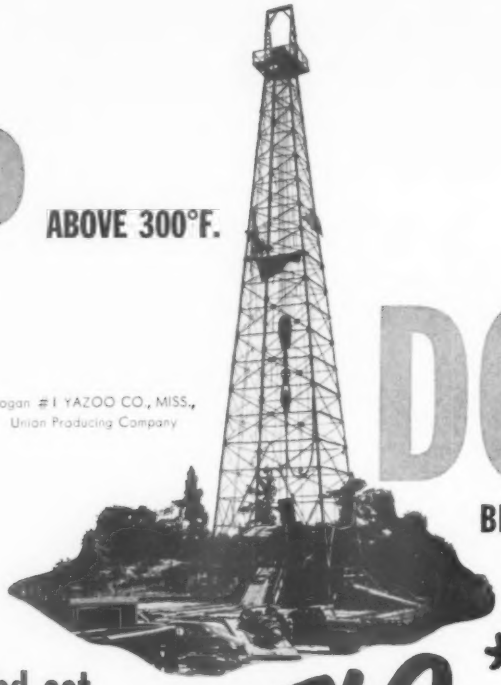
The plant extracts products from gas supplied by Tennessee Gas Transmission Co. and returns the dry gas to the pipe-line company.

Anchor Plant Operating

TULSA. — Anchor Gasoline Corp. has placed in operation its new natural-gasoline plant in North Tepetate field in Louisiana.

The plant has a gas-processing capacity of 30,000,000 cu. ft. daily, and a production capacity of 10,000 gal. of natural gasoline and 12,000 gal. of L.P.G. daily.

UP ABOVE 300°F.



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Scattered Uinta Wildcats Test Oil

CURRENTLY active wildcats in the Uinta basin have provided more indications that production may eventually be developed by fields spotted throughout that northeastern Utah area.

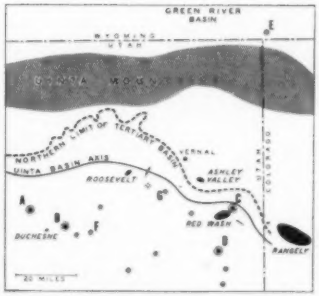
Out of the 15 or so announced or drilling wildcats scattered across the northern end of the gently dipping south flank of the Uinta basin, three have had substantial tests of oil in the base of the Tertiary-Green River formation; a fourth recovered oil from the Upper Cretaceous - Mesaverde. The three Green River wells are spotted at A, B, and C on sketch; the Mesaverde well is at D.

The well at A, Carter Oil Co. 1 Smith, recovered 3,080 ft. of oil on a drill-stem test at 8,807-57 ft. Carter 1 Moon, at B, has swabbed small amounts of oil from 6,500 ft. The well at C, Carter 1 Johnson, is completing —an assured oil-discovery stepout.

Other indications of commercial oil in the basal Green River have been found at two wells of Deep Wells Production, Inc., (F on sketch). These wells have pumped at rates of 5-60 bbl. of oil daily. The California Co. is getting small oil recoveries on tests of a Gusher area well (G on sketch), about 6 miles southeast of a not-quite-commercial "discovery" and a non-commercial confirmation test.

Continental Oil Co. is drilling ahead at 1 Chapita Wells (D on sketch) where 700 ft. of 60°-gravity oil was recovered from a 14-ft. interval about 1,400 ft. in the Mesaverde topped at 6,920 ft. This is the second well within the Tertiary-filled part of the basin to recover oil from the Mesaverde. The other, a Carter wildcat just off sketch to the south of 1 Chapita Wells, recovered some free Mesaverde oil on a drill-stem test, but failed to yield a commercial producer.

A few miles to the northwest of Rangely, Johnson and Bunn completed a Mesaverde gas well in June 1951 which potentialed more than 11 M.M.c.f. daily. Across the Uinta Mountains in the Green River basin, Stanolind Oil & Gas Co.'s Middle Mountain wildcat (E on sketch) is testing flowing Mesaverde oil at 6,540 ft. About 18 miles to the northeast of Stanolind's well, Mountain Fuel Supply Co. 1 unit (off sketch) is drilling ahead after testing an estimated 4 M.M.c.f. of gas daily in the Mesaverde at 7,550 ft.



Red Wash is now working on its twentieth well. This no-dry-hole field produces from lenticular sands in the transitional zone between the Green River and underlying Wasatch. A positive step toward solution of the transportation problems resulting from the basin's high (90°-100°) pour-point crude is being taken at this field with the installation of a heated gathering system and 7½-mile pipe line to tie to the Rangely-Salt Lake City crude-oil line.

Roosevelt now has seven oil wells and two dry holes. Two wells are drilling about 2 and 3 miles to the northwest and west of the discovery well, which has produced over ½ million barrels of oil from fractures in a lake deposit of calcareous basal Green River shales. The two oil wells at Duchesne produce from the Green River-Wasatch transitional zone.

Rangely field, by far the biggest producing field in the Rocky Mountain area (61,000 bbl. daily) and Ashley Valley field are outside the Tertiary basin. Principal production from these fields is from the Pennsylvanian-Weber (Tensleep), about 10,000 ft. stratigraphically deeper than the basal Green River development in the basin.

Complex geology, erratic producing sections, and production and transportation problems have caused cautious and modest development in the Uinta basin. However, given time, the few companies that hold major interests in the area can be expected to turn the basin into an important producing province.

Philip C. Ingalls.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

MONTANA . . . C. H. Murphy is completing his Poplar area wildcat in Roosevelt County. The 10 Unit, C SW NW 30-29n-51e, 4 miles northwest of East Poplar field, flowed oil in 160 minutes on drill-stem test from 5,626-40 ft. and on a later test the well showed 50 ft. of oil, 92 ft. of mud cut with water and gas and 60 ft. of sulfur water from 5,775-87 ft.

WYOMING . . . Stanolind Oil & Gas Co.'s Middle Mountain Mesaverde discovery west of Hiawatha field flowed 16 bbl. of oil in 3 hours through ½-in. choke. Production is from zone 6,534-44 ft. and testing is continuing.

NORTH DAKOTA . . . Deep Rock Oil Corp. is drilling below 8,985 ft. at 1 Brusich, SE SE SE 8-135n-98w, eastern Slope County wildcat, after cores showed limestones and dolomites with staining in vertical fractures.

SOUTH LOUISIANA . . . Union Oil Co. 2118-1 State Lease, West White Lake, Vermilion Parish, came in for an initial production of 310 bbl. of 37.7°-gravity oil daily. This wildcat discovery, 2 miles from nearest production, is the first indication of important oil production in what has been a primarily gas-condensate area.

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California

Fault-Block Discovery Made in Cuyama Valley

LOS ANGELES.—A new fault-block discovery southeast of Cuyama Valley's Russell Ranch field apparently has been made by Richfield Oil Corp. 15-9 Russell-A.

On a formation test at 3,617-53 ft., with hole bottomed at 4,190 ft., the well flowed 37°-gravity crude at a 400 to 500 bbl. daily rate. Following the test hole was plugged back to 3,188 ft., because of the poor condition of the hole, and was being redrilled for completion in the Diblee sand. The potential new pool opener is located in NW SW 9-10n-27w, about ½ mile east of existing Russell Ranch productive limits.

Two other wildcats were under way in the valley. Southeast of South Cuyama production about 1 mile, in NE NE 8-9n-26w, M. J. M. & M. Oil Co. 1 Wilshire-U. S. L. was redrilling below 8,139 ft. after having drilled to 9,567 ft. in the original hole. On the west edge of the valley, in NE NE 3-11n-30w, Seaboard Oil Co. 72-3 G. P.-Government had reached a depth below 2,100 ft.

In the Panorama Hills area west of McKittrick, San Luis Obispo County, Terry Drilling Co. 1 U. S.-Kane was in process of being completed as a gas-condensate discovery. Volumes were not all available, but the well was flowing gas, some 50°-gravity condensate, and a little crude. Production is through perforated liner at 3,730-4,040 ft., the latter being total depth. Located in NW NE 7-31s-21e, the wildcat is about 8 miles west of nearest western San Joaquin Valley oil fields.

At Wheeler Ridge, southeast San Joaquin Valley, Standard Oil Co. of California was drilling below 10,635 ft. at its wildcat ¾ mile southeast of Richfield's Eocene production. The interval 10,400-10,540 ft. was tested but results were not disclosed. Location of the extension well, 356 Kern County Land, is in NW SE 28-11n-20w.

Richfield's southeast offset to the discovery was being used by the company for a test of deeper Eocene pay possibilities. The well, 16-28 Kern County Land, picked up the deep pay at about the level found in the discovery. To test deeper possibilities, however, 7-in. casing was set at 9,892 ft. and hole since carried to 11,710 ft.

Developments in the Sacramento Valley gas areas included the staking of wildcats in Alameda and Yolo counties and the abandonment of a Sutter County wildcat. About 6 miles north of Saxon field in Yolo County, Humble Oil & Refining Co. staked 1 John C. Maxwell in 7-7n-3e. In Alameda County The Texas Co. staked 2 Hancock-Signal-Wente in 27-3s-2e, in the Hospital Nose area. he new test is about ¾ mile southeast of the company's minor discovery made last April in a 5,100-ft. pay.

At Marysville-Buttes in Sutter County, Richfield abandoned B-2 Butter Community after drilling to 3,900 ft. The wildcat, in 22-16n-2e, was about 5 miles northeast of the gas discovery Richfield made late in August. The operator is to start B-6 Butte Community as a 6 mile southwest stepout to the discovery.

A Los Angeles basin development was at Richfield's deep test on the southeast edge of Signal Hill. The test, 1 Recreation Park-E, was flowing 31.9°-gravity crude at the daily rate of 150 bbl., cut 10 per cent. Drilled to 9,781 ft., the edge test had been

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CALIFORNIA SUCCESSFUL WILDCATS

Kern County, Stevens sand discovery ¾ mile northwest of Bellevue field: Standard Oil Co. 53 Karpe, SW NE 34-29s-26e, pumped 92 bbl. per day through perforations at 8,780-8,810 ft., 30.7° gravity TD 9,466 ft., elev. 364 ft.

Kern County, Republic sand discovery in Midway field: Oceanic Oil Co. 1 General American, NE SE 16-32s-23e, pumped 192 bbl. per day gross, through perforations at 4,312-30 ft., 22° gravity, 17 per cent cut, TD 4,371 ft., elev. 1,391 ft.

Humboldt County, gas discovery 2 miles east of Eureka field: The Texas Co. 1 Little A, SW NE 24-3n-1w, flowed 4,000 M.c.f., through perforations at 5,400-5,795 ft., ¾-in. bean, TD 6,000 ft., elev. 948 ft.

CALIFORNIA WILDCAT FAILURES

Colusa County, Maxwell area: Union Oil Co. Union-Brazos-Welch, 32-17n-2w, dry, TD 3,001 ft., elev. 64 ft.

Fresno County, Kerman area: British American 31-1 M.I.D., 1-14s-16e, dry, TD 5,780 ft., elev. 195 ft.

Kern County, Bowerbank area: P. A. Doheny 1 Bowerbank Community, 6-29s-24e, dry, TD 5,000 ft., elev. 287 ft.

Tunis Creek area: Standard Oil Co. 7-21 Tejon Ranch 3, 21-11n-18w, dry, TD 3,023 ft., elev. 829 ft.

White Wolf Fault area: The Texas Co. 1 Tejon Ranch A (NCT-1), 21-31s-30e, dry, TD 1,647 ft., elev. 591 ft.

Tejon Hills area: Commonwealth Finance Co. 4-1 Tejon, 4-11n-18w, dry, Santa Margarita 805 ft., Valv Shale 1,295 ft., TD 1,765 ft., elev. 955 ft.

Kings County, Pyramid Hills area: Ancora Corp. 3 Capital, 16-24s-18e, dry, TD 3,100 ft., elev. 681 ft.

Los Angeles County, Aliso Canyon area: Union Oil Co. 1-65 Horse-Meadows, 3-2n-16w, dry, TD 7,511 ft., elev. 1,398 ft.

Chatsworth area: Sunray Oil Corp. 72-15 Greenman Comm. 15-2n-16w, dry, TD 6,940 ft., elev. 1,004 ft.

Marin County, Drakes Bay area: Standard Oil Co. 1 Robson, 33-2n-8w, dry, TD 7,286 ft., elev. unreported.

San Luis Obispo County, Morro Bay area: Wm. H. Provost 1 Sponner, 24-30s-10e, dry, TD 1,749 ft., elev. 467 ft.

San Miguel area: Sunray Oil Corp. 47-10 Sinclair, 10-25s-12e, dry, TD 6,049 ft., elev. 933 ft.

San Mateo County, Half Moon Bay area: Standard Oil Co. 1 Standard-Richfield-Cafferata & Pimental, 11-6s-5w, dry, TD 5,658 ft., elev. 500 ft.

Santa Cruz County, Watsonville area: Monterey Oil Co. 2 Porter, 30-11s-3e, dry, TD 3,977 ft., elev. 559 ft.

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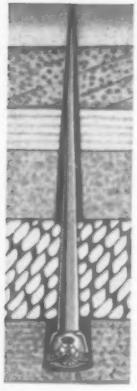

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North-Central Texas

Good Discovery Added To Nolan Production

WICHITA FALLS.—A new and good discovery has been added to Nolan County at Payne-Johnson 1 Little, 4 miles west of Trent in 25-20-T&P Survey. Completion gage was 152 bbl. of 48°-gravity oil in 5 hours through ¼-in. choke. Pay section was tentatively identified as the Caddo limestone, and perforations were from 5,400-15 ft.

Payne-Johnson and B. G. Byars staked location for a second test in the area, to be 1 A. H. McElmurry, 1½ miles east and slightly south of the discovery. Contract depth was 5,600 ft. and location is in 32-19-T&P Survey.

In Montague County, Jack Grace Production Co. completed 1 H. J. Ray, Section 27, Jack CSL, as a conglomerate discovery. Potential was 705 bbl. of 42°-gravity oil a day, based on a 10-hour test from pay topped at 6,023 ft. and perforated from 6,023-33 ft. Location is 3 miles southwest of Stoneburg.

Tom B. Medders 1 F. J. Whittaker, Wise County wildcat, has added new Bend conglomerate production to the Park Springs area. On 24/64-in. choke, the well gaged 41 bbl. of 41°-gravity oil from perforations at 5,770-83 ft. Location is in the J. B. George Survey, 2¼ miles west of Park Springs.

In Grayson County, S. M. Aronson and others 1 Fred Reynolds, wildcat 1½ miles east of Tioga, reported a prospective oil sand from 3,275-82 ft. A 30-minute test of the interval recovered 60 ft. of gas, 50 ft. of free oil and 40 ft. of mud cut with oil and gas. Operators ran casing to 3,273 ft. for open-hole completion. Location is on a Shell Oil Co. farmout in the P. Stork Survey.

Humble Oil & Refining Co. 1 Mark Williams, deep test in the Yglesias Survey, was drilling below 10,268 ft. in sand. Superior Oil Co. 1 S. L. Privette, 1 mile north of Dorchester, was coring at 7,896 ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCATS

Archer County: W. C. Wainwright 1 O. Calvin, Sulphur & Iron Works Sur., TD

(Continued on page 216)

Permian Basin

Yoakum Discovery May Complete at Present Depth

MIDLAND.—Amerada Petroleum Corp. 1 Weems, Yoakum County discovery, may be completed at present depth of 11,860 ft., further testing in the Devonian and in the Mississippian. Earlier plans were to drill ahead to the water table in the Devonian but operators were unable to obtain circulation. Drill-stem test through perforations at 11,850-60 ft. had flowing oil in 66 minutes and gaged 86.27 bbl. of oil in 4 hours and 15 minutes.

Gulf Oil Corp. and Jack Frost 1 Northrup, Delaware basin wildcat southeast of Pecos in Reeves County, has made several gas flows, with no oil other than distillate-cut mud. The well topped an unidentified sand at 12,250 ft. which produced several gas kicks. With packer around 11,620 ft. and total depth at 12,250 ft., an all-day test gaged 250,000 cu. ft. of dry gas. Operators then bailed a small amount of distillate-cut mud, from fluid level at 10,660 ft. On another test, when mud was displaced with water, the well flowed wash water at the rate of 2½ bbl. an hour for 8 hours, and died.

Humble Oil & Refining Co. 1 Riley had prospects of discovery production from the Canyon reef limestone. Drill-stem test in the lime from 8,919-70 ft. flowed an estimated 30 bbl. of 44°-gravity oil an hour. Operators logged another 28 ft. of indicated pay, then tested for 2 hours and 15 minutes between 8,973-98 ft. Oil reached the top in 1 hour and 10 minutes, and gaged 33.3 bbl. of oil in 1 hour. A core to 9,023 ft. recovered 9 ft. of limestone and dolomite with good odor and porosity and a test of the new section was under way. Location is about 2 miles southwest of Clear Fork production in Riley field and 4 miles northwest of the multiple-pay Doss field, which also has Canyon reef production around 8,850 ft.

Superior Oil Co. and Latex Oil Co. 14-598 Jordan, northeast corner of Borden County, completed as an Ellenburger discovery, flowing 184.4 bbl. of 43°-gravity oil a day through 8/64-in. choke from open hole at 8,421-32 ft. Top of the Ellenburger was 8,427 ft. on elevation of 2,817 ft.

Woods Oil & Gas Co. 1 Marie Decie, deepening operation 6 miles northwest of Marathon in Brewster County, cored 10 ft. around 8,534 ft., but had no shows. It is being redrilled on a 10,000-ft. contract.

Gulf Oil Corp. 1 Mitchell Bros., Presidio County wildcat, was drilling below 15,121 ft.

WEST TEXAS (DISTRICTS 8 AND 7-C) SUCCESSFUL WILDCATS

Runnels County: Keith D. Graham 1 Lena Martin, Sec. 41, GH&H Sur., TD 2,137 ft., pay 2,048 ft., IP 121 bbl. 46°-gravity oil, ½-in. choke, GOR 405 cu. ft., TP 75 psi.

Upton County: Woodward & Dan Auld 1 Ella Corbett, 11-B2-GC&SF, TD 10,897 ft., PB 6,206 ft., elev. 2,611 ft., Wolfcamp perforations 6,130-60 ft., IP 337 bbl. 32°-gravity oil, ¾-in. choke, TP 50 psi., GOR 530 cu. ft.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Crockett County: Pech Oil Co. 1-C University, dry, TD 1,851 ft.

Dawson County: Lawton Oil Corp. 1-A Martin, 41-34-T4N-T&P, dry, TD 9,946 ft., elev. 2,839 ft., Spraberry 7,043 ft., Pennsylvanian 9,722 ft.

Garza County: Big Horn Corp. 1 Rex. Welch, 2-4-Aycock Sur., dry, TD 3,291 ft., elev. 2,366 ft., Glorietta 2,881 ft., Clear Fork 3,147 ft.

McCulloch County: Montgomery and Spraggins 1 Sewell Smith, Phillips Jung Sur. 1,163, dry, TD 1,660 ft., Ellenburger 1,529 ft.

Runnels County: T. D. Humphrey 1 Roy Roper, H&GN Sur. 7, dry, TD 5,260 ft., elev. 1,818 ft., Strawn 4,300 ft., Joins 4,510 ft., Ellenburger 5,042 ft.

G. W. Strake 1 Will Pumphrey, 99-64-H&GGC, dry, TD 5,009 ft., elev. 1,993 ft., Goens 4,506 ft., Gardner 4,786 ft.

Schleicher County: Wolfe Co. 1 Will Loveless, T. J. Cartwright Sur. 5, dry, TD 5,742 ft., elev. 2,363 ft., Strawn 5,580 ft.

Scurry County: Hassie Hunt 1 Mary F. Gatlin, 92-97-H&TC, dry, TD 7,255 ft., elev. 2,270 ft., Wolfcamp 4,080 ft., Pennsylvanian 7,340 ft.

Slick-Moorman Oil Co. 1 Warren Sturgeon, 38-3-H&GN, dry, TD 7,885 ft., elev. 2,364 ft., Canyon 7,092 ft., Ellenburger 7,632 ft.

Sterling County: Honolulu Oil Corp. 1-A Robert Cope, 44-2-T&P, dry, TD 6,700 ft., elev. 2,664 ft., Grayburg 2,020 ft.

Sutton County: Continental Oil Co. 1 Sol Mayer, 2-C-GC&SF, dry, TD 8,652 ft., elev. 2,238 ft., Strawn 7,822 ft., Ellenburger 8,263 ft.

C. L. Norsworthy Jr. M. S. Clarkson, 46-14-TWNG, dry, TD 6,916 ft., elev. 2,318 ft., Strawn 5,425 ft., Ellenburger ½,885 ft.

Upton County: Oliver and Kotyza 1 George

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B. McCamey, Sec. 4, Rusk Transportation Co. Sur., dry, 2,057 ft.

Ward County: Intex Oil Co. 1 University, 14-16-University, dry, TD 2,910 ft., elev. 2,606 ft., Rustler 1,930 ft.

SOUTHEAST NEW MEXICO

Further testing at Sun Oil Co. and General American Oil Co. 1 Harper, indicated Delaware basin discovery, have been delayed by stuck tubing.

Sinclair Oil & Gas Co. Renshaw, wildcat 7 miles northwest of Denton field, developed 3,300 ft. of oil on a 2-hour drill-stem test in unidentified limestone at 10,947-21 ft.

Cities Service Oil Co. 1-AE State, west extension test to the Lovington area in 36-16s-36e, developed flowing oil in 26 minutes on a test of the Paddock limestone at 8,311-60 ft. A 1½-hour gage tanked 43.4 bbl. of 40°-gravity oil the first hour and 23.4 bbl. of oil the last 30 minutes.

SOUTHEAST NEW MEXICO WILDCAT FAILURES

Eddy County: A. J. Crawford 1 Crawford, 9-24s-27e, dry, TD 2,270 ft., Delaware lime 2,100 ft., sand 2,163 ft.

Buck Jones Drilling Co. 2 Gates-Federal, 29-26s-27e, dry, TD 2,075 ft., elev. 3,199 ft., Delaware lime 1,960 ft., sand 2,001 ft.

Lea County: American Liberty Oil Co. 1 State, 12-16s-35e, dry, TD 13,905 ft., elev. 3,977 ft., Strawn 12,138 ft., Mississippian 12,670 ft., Devonian 13,450 ft.

The Texas Co. 1 State "AY" NCT-2, 26-10s-37e, dry, TD 12,139 ft., elev. estimated 3,932 ft., Pennsylvanian 9,070 ft., Mississippian 11,400 ft., Devonian 11,975 ft.

Mississippi

Franklin Wilcox In Process of Completion

JACKSON.—In the extreme southwest part of Franklin County, Mississippi, Gulf Refining Co. 1 McCraine, 6-4n-1e, is in the process of being completed as a new Wilcox discovery for Franklin County. Casing was perforated 4,728-31 ft. and on drill-stem test well flowed 85 per cent salt water and 15 per cent oil. Perforations were squeezed with 85 sacks and the same zone reperforated. A drill-stem was again run and well flowed at rate of 121 bbl. of oil per day on 10/64-in. choke with tubing pressure of 320 psi. An additional sand was perforated from 4,716-25 ft. and the well will be completed from the above zones. In addition to the sands in which the well will be completed, another sand from 4,730-34 ft. was present in the well; however, no tests were made in this zone.

Approximately 3 miles northeast of production in Possum Corner field, Wilkinson County, Mississippi, the B. Serio-Norman Germany 1 Thaddeus Leak, 30-5n-2w, is in the process of being completed as a new Wilcox discovery for Wilkinson County. Also in the same field, but in Adams County, same operators have set pipe on 1 George Armstrong, 27-5n-2w, after having cored approximately 24 ft. of oil sand. From all indications this well should prove to be one of the better Wilcox producers in Southwest Mississippi. The Nomenclature Committee of the Mississippi Geological Society has adopted "Commencement field" as the name of this

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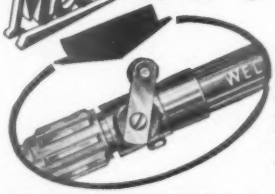

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new producing area. The name is taken from a plantation in the area.

MISSISSIPPI WILDCAT FAILURES

Adams County: Eagle Drilling & Development Co. and J. F. Michael 1 J. J. Newman-Central Lumber Co., 61-6n-1w, dry, TD 7,016 ft.

Richard W. Norton, Jr. 1 Edward Fletcher Est., 59-6n-1w, dry, TD 7,029 ft.

Clarke County: A. M. Keisker-C. A. Perkins et al 1 J. E. Toney Est., 28-1n-15e, dry, TD 5,009 ft.

Wayne County: R. Merrill Harris 1 J. V. Covington, 32-10n-7w, dry, TD 5,414 ft.

ALABAMA WILDCAT FAILURES

Clarke County: Humble Oil & Refining Co. 1 R. E. Gwin, 27-7n-3e, dry, TD 5,215 ft.

Escambia County: Sunnyland Contracting Co. 1 Hugh M. Caffey et al Unit, 21-1n-7e, dry, TD 7,006 ft.

Eastern Texas

Kaufman Wildcat Will Test Smackover Lime

DALLAS.—Humble Oil & Refining Co. has casing around 6,832 ft., total depth, at 1 Roy N. Moody, Kaufman County wildcat 4 miles north of Elmo, and will carry the project to 10,000 ft. to test the Smackover. Hole was originally scheduled to 7,000 ft.

A water-flood program in shallow Corsicana field of Navarro County has led to additional drilling in surrounding areas. C. E. Payne, Lubbock, and associates have filed application to drill 39 wells on the T. J. Hickey lease in the M. J. Tidwell Survey. Location would be on 5-acre spacing.

Hassie Hunt Trust has scheduled a 7,000-ft. wildcat on a 250-acre tract in the Ramon de la Garza Survey, A-8, in Leon County. Location is about 4 miles southwest of Kickapoo and 2½ miles southwest of Magnolia Petroleum Co. 1-A Swift, which was dry at 7,601 ft., earlier this year.

Hunt Oil Co. 1 L. A. Wakefield, Leon County wildcat north of Midway, was coring below 8,090 ft., with no shows reported.

Floyd C. Ramsey 2 Paul, confirmation try to the new Woodbine discovery east of Cash in Hunt County, was dry at 3,564 ft., total depth.

EAST TEXAS (DISTRICTS 5 AND 6) SUCCESSFUL WILDCAT

Gregg County: Ray Holbert Drilling Co. 1 H. C. McGrede, P. P. Rains Sur., 3½ miles N Longview, TD 6,970 ft., elev. 312 ft., perforated Young zone 6,914-34 ft. IP 110,000,000 cu. ft. gas, plus 2,024 bbl. of 57°-gravity distillate, open flow, SIP 3,125 psi.

EAST TEXAS (DISTRICTS 5 AND 6) WILDCAT FAILURES

Falls County: Ashton Glassell 1 J. A. Dunkum, Wm. Marlin Sur., dry, TD 2,211 ft.

Hill County: Camtex Oil Corp. 1 A. H. Cartwright, E. Hart Sur., dry, TD 1,204 ft.

Kaufman County: Cooper-Herring and R. S. Peveto 1 J. B. McGinty, J. E. Roof Sur., A-413, dry, TD 4,921 ft., elev. 530 ft., Austin chalk 2,244 ft.

Lamar County: W. E. Stewart 1 A. H. Bywaters, J. Kimble Sur., dry, TD 2,832 ft. elev. 499 ft., sub-Clarksville 1,130

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Navarro County: Eugene Constantin Jr. 1 Kate Wright, P. J. Burrow Sur., dry, TD 1,498 ft.

Intex Oil Co. 1 P. T. Fullwood, Abner Mathews Sur., A-544, dry, TD 3,261 ft.

Red River County: Retsal Drilling Co. 1 Southern Pine Lumber Co., D. D. Bruton Sur., dry, TD 2,190 ft.

Tarrant County: Rowan Oil Co. 1 B. L. Markum, R. Bissett Sur., A-192, dry, TD 7,126 ft.

Van Zandt County: Cooper-Herring Drilling Co. 1 J. C. Gibbs, W. Steel Sur., A-801, dry, TD 4,233 ft.

Wood County: Ralph Spence 1 Paul Gorman, G. B. King Sur., dry, TD 4,616 ft., elev. 480 ft., sub-Clarksville 4,180 ft., Harris sand 4,468 ft., Woodbine 4,572 ft.

Texas Gulf Coast

Gas Tested at Fort Bend County Wildcat

HOUSTON.—One mile west-northwest of the nearest oil production in Fulshear field of Fort Bend County, Sunray Oil Corp. has tested small amount of gas on drill-stem test through perforations 7,691-97 ft. in 1 Clyde Nelson, 7,812-ft. wildcat. An 8-hour 47-minute test developed working pressure at the surface of 65 psi. and flowed water cushion in 37 minutes. Test flowed water cushion by small heads for 2 hours and 30 minutes and blew small amount of gas for balance of test. Recovery was 180 ft. of water cushion, 370 ft. of drilling mud, 6,700 ft. of salt water, with bottom hole flowing pressure of 1,525-3,025 psi. and 3,025 psi. shut-in pressure. Location is 2½ miles south of Katy, on the George W. Cartwright Survey.

TEXAS GULF COAST (DISTRICTS 2 AND 3) SUCCESSFUL WILDCAT

Goliad County: Currie B. Davis 1 Mrs. Ada Hanley et al, Townsend & Holly Sur., dry, TD 4,481 ft.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Colorado County: T. C. Huddle & Rock Hill Oil Co. et al 1 Henry Tipp, Franz Tipp Sur., dry, TD 11,000 ft.

Karnes County: Great Lakes Carbon Co. 1 May Jones, Gaspar Flores Sur., dry, TD 3,366 ft.

Live Oak County: Buzzini Drilling Co. 1 A. C. Pfeiffer, Joan Conway Sur., dry, TD 7,861 ft.

Refugio County: Kirkwood & Morgan, Inc. 1 Reno M. Dammann, J. M. and M. Aldrete Grant, dry, TD 5,647 ft.

Tri-Mark Oil Co. 1 Mary Ellen Fox, John Coughlin Sur., dry, TD 6,023 ft.

Victoria County: Jeff Carr 1 Krahl, Francisco Ramon Grant, dry, TD 6,398 ft.

Wharton County: Sperry-Young Production Corp. 1 Lena Blumberg et al, Sarah Gilbert Lge., dry, TD 6,212 ft.

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Louisiana-Ark.

Possible Reef Production Seen at Summerfield

SHREVEPORT.—There are strong indications that first production in new Summerfield field, Claiborne Parish, is from reef. Two confirmation tests are to test the Smackover. Magnolia Petroleum Co. is coring below 11,284 ft. at 1 Drew F. Hightower, C SW SW 18-22n-4w, which is about 2,700 ft. southeast of the discovery well in the field. Operator will run casing to test possible Smackover pay which was logged approximately 700 ft. below that interval in which pay was found in the discovery well to indicate a sharp buildup of reef.

Arkansas.—Deep Rock Oil Corp. is running production string and will test the St. Peters sand topped at 3,150 ft. at 1 Sample, C N½ SW 4-10n-6w, rank White County wildcat in central Arkansas. A drill-stem test from 3,512-38 ft. showed gas with top pressure of 33 psi. Latest test in this interval lasted 4 hours with a working pressure of 16½ psi., recorded with gas to surface in 3 hours and 35 minutes. Gas flow was less than 1,000 M.c.f. daily with recovery being 110 ft. of gas-cut mud.

LOUISIANA WILDCAT FAILURES

Caddo Parish: Lion Oil Co. 1 Watters, C NE NW 32-22n-14w, dry, TD 5,005 ft.

Concordia Parish: Barnett Serio et al 2 Quinn, C SW SE 4-4n-7e, dry, TD 7,510 ft.

Barnett Serio et al 2 Hattisburg Bank & Loan Co., C NE NW 45-3n-8e, dry, TD 7,510 ft.

Bossier Parish: Alton Coats et al 2 Jones & Rhodes, 500 ft. S and 115 ft. E of NWc 4-20n-12w, dry, TD 3,407 ft.

Madison Parish: Less & Coyle 1 Gilfoil, 660 ft. S and 710 ft. W of NEc SE 58-18n-13e, dry, TD 3,852 ft.

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Sabine Parish: Carter Oil Co. 1 Louisiana Long Leaf Lumber Co. "A," C NW NW 14-6n-11w, dry, TD 5,196 ft.

ARKANSAS WILDCAT FAILURE

Ouachita County: J. A. Cararas et al 1 Reynolds "A," C S½ NW SE 18-14s-16w, dry, TD 1,658 ft.

Oklahoma

Noble County Wildcat Makes Wilcox Producer

FORDEE-RHOADES OIL CO. has a new Wilcox discovery in Noble County where its 1 Lyhane, NW SW SE 4-23n-2w, a wildcat 2½ miles east of the old Billings field, flowed 150 bbl. of oil in a 24-hour production test with flow restricted to 12/64-in. choke. Pay is in open hole at 4,748-58 ft. with top of the first Wilcox sand at 4,752 ft. Spot location is in the NW SW SE 24-23n-2w.

In northern Logan County, near the Garfield County line, A. O. Olson 1 Filtz, SE SE SE 34-20n-3w, swabbed 2½ bbl. of oil per hour in starting production test of prospective Wilcox sand, opposite which casing is perforated at 5,895-40 ft. After fracturing treatment, it flowed 190 bbl. of oil in 24 hours through ¼-in. choke. Location is 5 miles east of Marshall. Nearest production is 4 miles to the east in the Lucien field.

Additional potential pay has been logged in Parker Drilling Co.'s much-watched Anadarko basin wildcat, 1 Boyd Miller, located 3 miles north of Independence, in Custer County. Latest drill-stem test, taking in an interval at 11,525-60 ft., got a gas flow estimated at 7,000,000 cu. ft. per day and recovered 3,300 ft. of gas-cut mud. Bottom is reported still in the Springer section, top of which was given as 11,480 ft. Drilling continues.

Favorable indications of Arbuckle production for the new area opened by Mid-Continent Petroleum Corp. northwest of the old Tipton pool in Jackson County have been given in that company's 3 Richardson, NE SW SE 30-1n-19w. Production in the two previous wells completed is from granite wash. The present well also showed for production in granite wash. Arbuckle was topped at 2,522 ft. Two drill-stem tests, one at 2,515-44 ft. and the other at 2,524-44 ft., got substantial oil recoveries. The first recovered 1,300 ft. of oil and 336 ft. of oil-cut mud. The second had 1,390 ft. of oil and 256 ft. of oil-cut mud. This well is a location north of the discovery producer.

OKLAHOMA SUCCESSFUL WILDCATS

Garfield County: John Grooms 2 Cassidy, NW NW SE 23-22n-3w, flowed 3,300 M.c.f. of gas daily from Hodges sand 1,430-35 ft., TD 2,372 ft.

Pottawatomie County: R. L. Rheem et al 1 Prater, NW NE SW 23-9n-3e, pumped 40 bbl. of oil from Wilcox 5,306-09 ft., TD 5,421 ft.

OKLAHOMA WILDCAT FAILURES

Carter County: Jones Oil Co. 1 Bruce, SE SW NW 21-4s-1e, dry, TD 7,592 ft.

J. D. Lewis 1 Morris-Luster, NW SW SW 9-1s-2w, dry, TD 2,591 ft.

Hughes County: F. B. Murta & Son 1 Hamilton, NE SW SW 15-9n-10e, dry, TD 3,291 ft.

Lincoln County: Parker Drilling Co. 1 Klabzuba Royalty Co. et al, NE NW SE 11-12n-5e, dry, TD 4,699 ft.

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Great Lakes Carbon Corp. 1 Erwin, N½ NE NW 6-14n-3e, dry, TD 5,076 ft.
Finston-Threadbear 1-A Decker, SW SW NE 1-15n-2e, dry, TD 4,514 ft.
Logan County: Sunray Oil Corp. 1 Wetzel, NW NW NE 22-16n-1e, dry, TD 5,483 ft.
Love County: Texas Pacific Coal & Oil Co. 1 Tippit "A," NW NW NW 32-6s-3e, dry, TD 3,000 ft.
Noble County: Wolfe & Haddock 1 White, NE NE NE 1-22n-2w, dry, TD 5,268 ft.
Pittsburgh County: Dorset Co. et al 1 Leatherwood, NE SW NE 29-6n-13e, dry, 1,400 ft.

Canadian Fields

New Light Oil Strike Made at Hamilton Lake

CALGARY.—Viking sand oil has been discovered by a team of Calgary-based independent oil companies. This new light gravity oil strike is in the Hamilton Lake area of southern Alberta, 135 miles northeast of Calgary.

The discovery well is Ranchmen's 1 Hamilton Lake on LSD 8, 14-35-9w4, on Sun Oil land, 7 miles northeast of Western-Trinidad 2-27 Watt Lake Viking gas discovery well and 40 miles northeast of Hanna.

Crew drill-stem tested Viking interval 2,992-3,035 ft. for 2½ hours and recovered 540 ft. of clean oil, 90 ft. of oily mud, plus 90 ft. of mud. Natural gas flow rate was 10,000 cu. ft. daily. Gravity of the oil is between 37 and 38°.

Socony 1 Three Hills on LSD 8, 35-31-25w4, is 6 miles due west of Three Hills town and 48 miles northeast of Calgary. First drill-stem test in that oil horizon, which is a shale and limestone formation, was run for 1 hour, from 7,670-7,700 ft. Natural gas flowed to the surface in 45 minutes, at rate too small to measure, and recovery consisted of 1,000 ft. of in-put water and 750 ft. gassy oil. Gravity of the crude oil was 42°. Crew cored ahead and ran drill-stem test from 7,703-21 ft. Fluid recovery included 1,000 ft. of in-put and 3 ft. of drilling mud. Crew is now preparing to resume drilling operations, bottomed at 7,799 ft.

CANADIAN WILDCAT FAILURES

Twin River Pete Sioux 1 Chauvin, LSD 3, 22-45-2w4, TD 5,344 ft.
Antone Socony 1 Delia, LSD 4, 10-31-18w4, TD 6,208 ft.
Coverdale 1, LSD 4, 25-55-4w4, TD 1,397 ft.
Jet-Ashmont 1 Milk River, LSD 6, 28-1-11w4, TD 2,850 ft.
Allenbee-Peak & Associates Can. Southern 1 Suffield, LSD 10, 22-15-10w4, TD 4,085 ft.

Appalachian-Ohio

Wildcat Slated For Middle Fork District

PITTSBURGH.—In Middle Fork district, Randolph County, West Virginia, Nollem Oil & Gas Corp., Agt., located wildcat 1 Moore, Keppel & Co., Inc., elevation 2,275 ft., .20 mile south of latitude 38 degrees 50 minutes and 42 miles west of longitude 80 degrees 00 minutes. It is on the Sago Quadrangle. Portland district, Preston County, Hope Natural Gas Co. 9673 Nina Kay, elevation 2,296 ft., resulted in a dry hole. Two sections of the chert and Oriskany sand were reported: chert 5,479-5,639 and 5,669-98 ft., Oriskany sand 5,639-5,669 and 5,698-5,941 ft., TD 6,002 ft. Harris district, Wood County, B. H. Putnam 1 V. C. Whitlatch gaged 1,200,000 cu. ft. gas, in the Keener sand, TD 1,579 ft. Jumping Branch district, Summers County, United Fuel Gas Co. 1-6788 J. Sanford Lilly, elevation on 2,613 ft., after a fishing job, has resumed drilling and is at a depth of 7,170 ft.

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Verne Newman drilling on fee property in Lot 9, Bath Township, Summit County, reported 120,000 cu. ft. gas in the Oriskany, found at 2,187-2,232 ft. The sand was acidized and gaged 425,000 cu. ft. when shut in.

Southwest Texas

New Pay Confirmed In Tabasco Field

CORPUS CHRISTI.—Houston Oil Co. and American Republics Corp. 3 Temple W. West et al, Hidalgo County confirmation test, has been potentialed for an estimated 14,000 M.c.f. of gas per day plus 71.22 bbl. of distillate through perforations shot at 6,934-44 ft. Drilling operators topped the Vicksburg "O" sand at 6,934 ft. Production perforations are 730 ft. below completion perforations shot in the 2 Temple W. West oil discovery where perforations were made at 6,204-14 ft. Completion of the 3 Temple W. West confirms new pay sand in Tabasco field. Hole is bottomed to total depth of 7,257 ft.

Kirby Petroleum Co. has set 5½-in. production casing at A-2 John Brannan, El Benaditio.

After running log at 4,728 ft. operators took sidewall samples from 4,575-87 ft. and 4,597-605 ft. which indicated oil and gas at B-1 State-Slick "B," El Ebanito outpost in Starr County. The operators, Chicago Corp. of Corpus Christi, ran drill-stem test from 4,597-605 ft. No pressures were recorded and recovery was 1,600 ft. of salt water and 50 ft. of mud. Another test was run on section from 4,576-86 ft. Well flowed under 500 psi. working pressure in 12 minutes which revealed recovery of 120 ft. of gas-cut mud with 180 ft. of gas and distillate-cut mud and 270 ft. of oil and gas-cut mud with salty taste. At present the well is bottomed at 4,728 ft. with operators running casing to squeeze off salt water.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCAT

Nueces County: Republic Natural Gas Co. 1-112 Chapman Ranch, Laurles Farm Tracts, 18 miles SW of Corpus Christi, TD 7,480 ft., IPF open flow 8,200,000 cu. ft. of gas per day, ⅛-in. choke.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Atascosa County: Sid Katz 3 D. D. Heinen, Carlos Perez Sur., dry, TD 1,423 ft.

Rowan & Hope, & E. W. Gill, 1 Charles H. Brown, John Rugley Sur., dry, TD 5,820 ft.

Wherry & Green & Marrs McLean 1 A. H. Jungerman, Rogue Mauricio Sur., dry, TD 1,827 ft.

Forney & Winn 1 Allen Hime, J. Poitevent Sur., dry, TD 2,073 ft.

Clayton N. Smith 1 Louis Krestin, John Neill Sur., dry, TD 1,910 ft.

Bexar County: Larry Rogers 1 Larry Rogers Fee, Wm. Head Sur., dry, TD 949 ft.

Caldwell County: C. L. Riddle 2 J. M. Riddle, A. Lytton Sur., dry, TD 2,284 ft.

Brooks Rogers 1 W. H. Watkins, Dorothy Benton Sur., dry, TD 2,135 ft.

L. L. Carter 1 City of Lockhart et al, Samuel Shupe Sur., dry, TD 2,481 ft.

Duval County: Regal Oil Co. & Appell Drilling Co. 1 Alfred G. Stillman, La Huerta Grant, dry, TD 5,302 ft.

Guadalupe County: Gasoline Producing Co. 1 Henry Seay, L. Mansola Sur., dry, TD 2,235 ft.

Gasoline Producing C.o 1 Stanley Kubela, Ephrain Bollinger Sur., dry, TD 1,880 ft.

Jim Wells County: F. Wm. Carr 1 G. W. Reynolds, I&GN Sur., dry, TD 5,211 ft.

Daubert & Achning 1 Jarvis E. Miller, Casa Blanca Grant, dry, TD 5,875 ft.

The Texas Co. 9 J. M. Valadez, Daniel Valadez Sur., dry, TD 6,209 ft.

Kenedy County: Humble Oil & Refining Co. 1 Laguna Madre, State Tract 326, dry, TD 10,000 ft.

Kinney County: Laan-Tex Oil Co. 1 Bernice E. Atkinson, BBB&C Sur., dry, TD 860 ft.

McMullen County: Kirkwood & Morgan, Inc. 1 H. D. & Sam Countiss, Thomas J. Hughes Sur., dry, TD 6,022 ft.

Milam County: J. H. Messer 1 W. T. Johnson, J. J. Acosta Sur., dry, TD 2,167 ft.

Wintex Petroleum Co., Ltd. 1 Olga Kosel, W. F. Nelson Sur., dry, TD 2,704 ft.

Nueces County: The Whitney Co. 1 Louis Eggert, Geo. H. Pauls S/D of Driscoll Ranch, dry, TD 7,020 ft.

Starr County: Howeth & Mason 1 Gonzales Heirs, 7 miles NW Roma, dry, TD 5,177 ft.

Webb County: J. K. Maxwell 1 Prudencia de la Garza, H&GN Sur. 335, dry, TD 4,798 ft.

Harry E. Murray et al 1-A Elfred Withers Dobie, ASBS&M Sec. 28, dry, TD 1,571 ft.

Wilson County: O. G. McClain 1 N. A. Poth, Gasper Flores Grant, dry, TD 6,220 ft.

Travis County: Homer Alexander 1 Anderson, Rodriguez Sur., dry, TD 1,602 ft.

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Central Area

ILLINOIS

An exceptionally good Waltersburg discovery appears to have been made by Ashland Oil & Refining Co. and associates at their 1 Bingham heirs, a wildcat located in the SW NW NE 19-5s-14w, 3 miles northeast of Maunie and 9 miles east of Carmi. The indicated well logged Waltersburg saturation at 2,302-12 ft., and in a 60-minute drill-stem test got gas in 50 minutes and recovered 1,275 ft. of clean oil, 120 ft. of oil-cut mud, and 60 ft. of mud-cut oil without any water. Bottom-hole pressure was 970 psi. Oil string has been run to the top of the pay. Location is 1½ miles northeast of production in the Maunie pool.

The Texas Co. is preparing to test an indicated McClosky producer at its 1 Lane, SE NW NE 35-5s-6e, an outpost for the Dale Consolidated pool in the area 2½ miles southeast of the McLeansboro. A drill-stem test, open 2 hours, of the prospective pay zone, logged at 3,337-54 ft., had gas at the top in 38 minutes and filled 390 ft. of oil with bottom-hole pressure of 1,125 ft. Hole was drilled to 3,385 ft., and casing run to the top of the pay.

INDIANA

Another oil discovery, the third this year, has been made in the extreme southern part of Vanderburgh County, just across the Ohio River from Henderson County, Kentucky. The indicated discovery well is Stanley T. Welch and associates 1 Kuester, SE SE SE 35-7s-11w, which, in a 60-minute drill-stem test of McClosky lime at 2,476-85 ft., recovered 1,500 ft. of clean oil and 60 ft. of oil-cut mud with 240 ft. of water. Location is a mile northwest of the Rahm pool, opened early this year, producing from the O'Hara and McClosky zones, and a mile southwest of the more recently opened Barker pool, producing from Cypress sand and Rosiclare lime.

Morris Drilling Co. 1 McRoberts, Military Donation 89-1s-10w, new Gibson County discovery, swabbed at the rate of 4 bbl. of oil per hour natural while testing its Benoist sand pay 1,645-51 ft. Location is 3 miles northeast of Patoka, and about a mile southwest of production of the Union-Bowman field.

A ¾-mile northeastward extension of production in the Monroe City pool, 3 miles southeast of Monroe City, is indicated by showings encountered by Affeld Oil Co. at its 1 Starrett, NE NE SE 20-2n-8w. Showings were in Rosiclare lime, in which a 60-minute drill-stem test at 1,397-1,401 ft. recovered 800 ft. of clean oil and 290 ft. of mud-cut oil without water.

WESTERN KENTUCKY

William E. Styles is putting his 1 Donovan, northern Daviess County wildcat, on the pump following swabbing tests which produced 105 bbl. of oil in 12 hours from Aux Vases sand, opposite which casing is perforated at 1,776-84 ft. Location is in 19-Q-27, 3 miles northwest of Stanley, and ½ mile northwest of an O'Hara discovery well, same section, being completed by M. W. Howard at 1 MacHensley. The area is 2 miles east of the Reed East pool (northeastern Henderson County), nearest other production.

EASTERN KENTUCKY

In western Elliott County and located at the mouth of Fulton Creek practically on the Morgan County line, Raymond Long et al is drilling at 985 ft. at 1 Robert Wilson. Test is a wildcat to the Corniferous lime and is on the southern extremity of the Wyatt dome. Earlier in the year a dry hole had been drilled to the north on the crest of the structure.

In Greenup County and in the recently discovered Oldtown pool, Van Everman et al is preparing to acidize at 2-O Hall. Test was carried a short distance into the Corniferous lime topped at 1,315 ft. Successful completion will make it the seventh producer in this field.

MICHIGAN

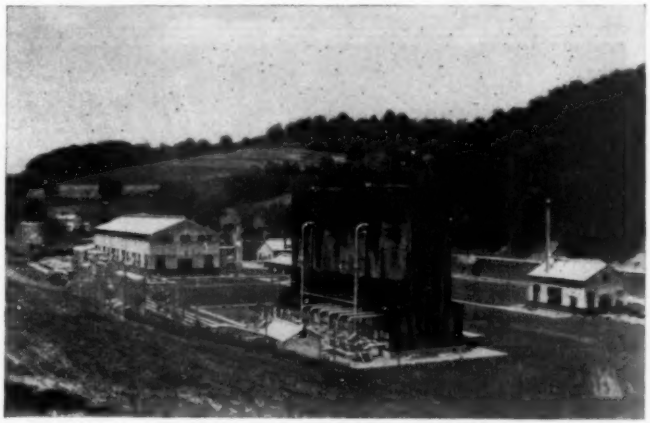
Pumping unit was set, after acid treatment with 1,000 gal. and extensive swab-flow testing at Lud Segerlund 1 Caner et al, NE NE NE 11-19n-5w, Greenwood Township Dundee oil discovery well, Clare County. This wildcat, Michigan's newest discovery, was reported to have swabbed and flowed 135 bbl. and 125 bbl. of oil first 2 days after acid, with 4 bbl. of water showing each day. Wildcat is bottomed out in the Dundee

(Continued on page 216)

Rocky Mountain

Mixed Developments Prevail in Region

DENVER.—Mixed developments prevail over much of the Rocky Mountain region in the current week, with some important wildcats abandoned in areas which had held special interest, and others testing possible



Preston Station, near Waynesburg, Pa., one of the compressor plants of the New York State Natural Gas Corporation.

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commercial shows with no conclusive results.

In Montana and North Dakota Deep Rock Oil Corp. has two important wildcats, both possible discoveries of importance, and both not tested conclusively.

Deep Rock's 1 Brusich, SE SE SE 8-135n-98w, in Slope County, North Dakota cored additional shows from the interval 8,720-70 ft. The recovery was lime and dolomite with both vertical and horizontal fractures, with staining in fractures, some apparent porosity, and fair to good fluorescence. This wildcat recovered oil and gas cut mud from zones above this interval and is regarded as a possible commercial discovery in the southern portion of the state.

In extreme eastern Roosevelt County, Montana Deep Rock recovered oil-cut mud from the 1 Picard, C NW NE 6-29n-58e, with drill-stem test of the interval 8,726-8,840 ft. Tool was open 2 hours in this zone and recovery was 352 ft. of oil-cut mud and 334 ft. of oil-cut, slightly watery mud with a flowing pressure 0-500 psi. A core from the interval, 8,755-8,813 ft. had good vertical and horizontal fractures, with fair to good staining fluorescence and odor. Bottom 2 ft. of the core had shows, and the operators will core and test below 8,813 ft.

In Wyoming's Big Horn basin Husky Oil Co. of Cody has tested water in Phosphoria at the important wildcat in the Five Mile area of Big Horn County, 1 Government, SE NW SW 12-49n-94w. This well is 3½ miles northwest of the discovery in the area by this operator which produced gas and distillate from Phosphoria. During drilling the current wildcat had casing set through Phosphoria without testing, and Tensleep shows were tested, and are apparently of no commercial significance. Perforations and test of Phosphoria were between 12,580-598 ft., and recovery was 9,000 ft. of black sulfur water in 17½ hours. Husky will continue testing.

In the Manderson area of Big Horn County, General Petroleum Corp. has tested a confirmation success in the Manderson area, where the company completed a 480-bbl. per day producer last year. Further drilling had not been done pending unitization, which was recently completed. The current well is F-14-28-P, C SW SW 28-50n-92w, and test flowed 796 bbl. of oil in 15½ hours through ⅝-in. choke. Production is from Phosphoria, with gas-oil ration of 1,389 cu. ft. per bbl. Gas produced is sour.

At Middle Mountain in Sweetwater County, Stanolind Oil & Gas Co. has reported a flow of 16 bbl. of oil in 3 hours through ½-in. choke at the 1 Unit, SW NE NE 10-12n-103w, important Mesaverde discovery in this area. Production was from the zone 6,534-44 ft. and testing continues.

Southeast of this Wyoming wildcat, Hiwatha Oil & Gas Co. is swabbing at 1 State, C NW NW 36-7n-81w, in the Coalmont anticline area of Jackson County. The well is apparently one of the largest producers ever completed in Colorado. It made 65 bbl. of oil per hour from Frontier sands on 10 hour drill-stem test but mudded up at the end of that time making swabbing necessary for clean out. The flow on the 65 bbl. per hour gas was on ½-in. choke.

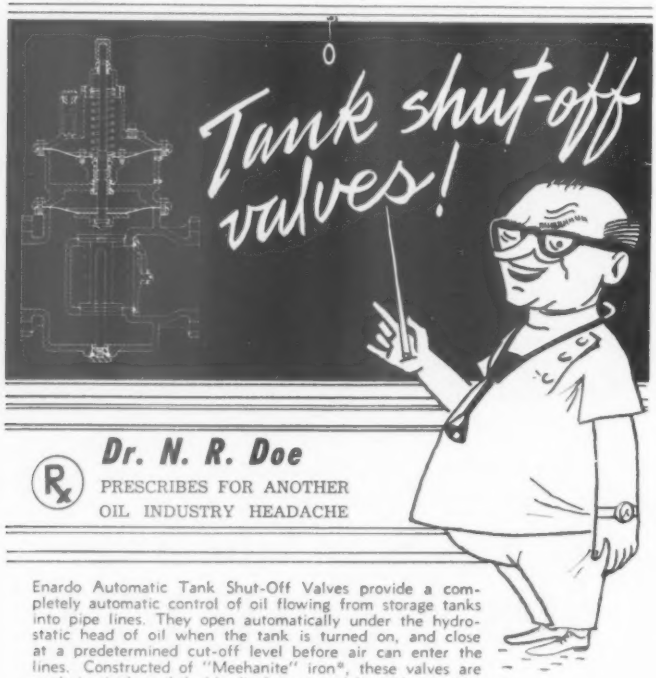
In southeastern Colorado, Continental has had shows at a second wildcat in the series being drilled along the general Las Animas arch area. The company's 1 White, SE SE SE 20-19s-45w, in the East Eads area recovered oil and gas-cut mud and salt water on test of the Kansas City from 4,068-88 ft. Recovery was 200 ft. of oil-cut mud, and 460 ft. of salt water. Flowing pressure was 300 psi. Continental is drilling at 4,854 ft. A small gas discovery in SE SE SE 11-20s-49w was recently completed and shut in by this operator, after a gage of 200,000 cu. ft. per day.

WYOMING WILDCAT FAILURES

Carbon County: G. H. Vaughn Production Co. 1 Unit, SW NE NW 11-15n-91w, dry, TD 10,329 ft.

Sublette County: General Petroleum Corp. 43-19G, NE SE NW 19-29n-114w, dry, TD 14,740 ft.

(Continued on page 223)



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South Louisiana

Avoyelles Discovery On State Potential

NEW ORLEANS.—Kemp Drilling Co. 1 Fisher is an oil discovery in Avoyelles Parish. Discovery, which is now running state potential, previously flowed at rate of 6 bbl. of 42°-gravity oil per hour through 9/64-in. choke, under 450 psi. tubing pressure. Production of the 8,505-ft. well is from perforations at 7,403-05 ft. Previous test, with packer set at 7,385 ft., the well flowed at rate of 120 bbl. of oil daily through 3/8-in. bottom and ¼-in. top chokes. Tops were called on the Winona at 5,308 ft., Wilcox 5,354, base Big shale 6,569 ft., base Baker shale 7,006 ft. and oil sand 7,403-10 ft.

In the West White Lake area, Vermilion Parish, Union Oil Co. of California has tested its 1 State Lease 2118 for 310 bbl. of 37.7°-gravity oil per day through 10/64-in. choke. Test flowing through perforations from 8,860 to 8,880 ft. registered 1,500-psi. tubing pressure and gas-oil ratio was 610 to 1.

Originally drilled to 12,692 ft., well was plugged back to 9,400 ft. before setting 5½-in. casing at 9,359 ft., after log and sidewall samples indicated oil and gas sands.

SOUTH LOUISIANA WILDCAT FAILURES

Allen Parish: Bateman Drilling Co. and Est. of Wm. G. Hellis 1 Madison Manuel, 10-7s-5w, dry, TD 8,456 ft.

Avoyelles Parish: Hunt Oil Co. 1 Morgan W. Walker, 23-1w-6e, dry, TD 9,640 ft. Pan-Am Southern Corp. 1 Southwest Imp. Co., 1-2n-6e, dry, TD 9,312 ft.

Plaquemines Parish: The California Co. 1 Lawrence Adam et al, 17s-25e, dry, TD 11,873 ft.

Rapides Parish: F. Kirk Johnson 1 Bentley Lumber Co. 4-4n-4w, dry, TD 7,810 ft.

Kansas

Finney County Wildcat Produces on Swab Tests

THE indicated Cooperative Refinery Association discovery well, 1 Sonderegger, 14 miles northeast of Garden City, in Finney County, western Kansas, swabbed 67 bbl. of oil in 8 hours on a production test of Mississippian casing perforations at 4,729-34 ft. and 4,738-48 ft. With plug at 4,727 ft., above that zone, and casing perforated at 4,705-26 ft. in Cherokee (Pennsylvanian) lime, it swabbed initially, after 500 gal. of acid, 63 bbl. of oil in 6 hours, and, after an additional 2,000 gal. of acid, 44½ bbl. of oil in 4 hours. Cherokee top is 4,588 ft. with the Mississippian at 4,737 ft. Location, in the C NE NE 21-22-31, is 4½ miles northwest of another Finney County discovery well completed by the same operator last July, and 12 miles east of the Damme pool, nearest other production.

Carl Todd Drilling Co. 1 Newcomer, NE NE NE 12-13s-21w, which opens a new Arbuckle lime area a mile south of the Ellis pool, in the east central part of Trego County, swabbed 14 bbl. of oil per hour during a 5-hour test. Pay is in open hole at 3,816-37 ft. with top of the Arbuckle at 3,814 ft.

Shelley-Miller Drilling Co. is putting its 1 Bieberele, NW NW NW 4-19-11, a wildcat located a mile northeast of the St. Peter pool, eastern Barton County, on the pump following swabbing tests in which the well produced 18 bbl. of oil per hour for 2 hours after acidizing. Pay is Arbuckle lime, open at 3,398-3,405 ft.

Three-fourths mile west of the St. Peter pool, J. A. Teterling & Sons are starting production tests at their 1 Kramp, NW NE NE 7-19-11, which had promising oil showings in the Lansing-Kansas City section, topped at 3,081 ft. Best showings were in an interval at 3,084-3,130 ft., where a 30-minute drillstem test got 700 ft. of oil and 200 ft. of oil and gas-cut mud with bottom-hole pressure of 840 psi. Hole is bottomed at 3,353 ft. in Arbuckle lime, topped at 3,351 ft. Casing is on bottom.

KANSAS SUCCESSFUL WILDCATS

Harper County: The Texas Co. 1 Baker, NE SW NW 24-34s-5w, pumped 26 bbl. of oil from Kansas City 3,938-43 ft., TD 5,699 ft. (opens Bluff Creek pool).

Meade County: Skelly Oil Co. 1 Sheetz, SW SW NE 28-33s-26w, flowed 8,700 M.c.f. of gas from Chester 5,778-95 ft., TD 5,880 ft.

Stafford County: Helmerich & Payne 1 Koelsch, SW SW SW 24-24s-14w, flowed 2,583 bbl. of oil from Lansing-Kansas City 3,750-58 ft., TD 4,290 ft. (opens Koelsch pool).

KANSAS WILDCAT FAILURES

Barber County: Champlin 1 Wheats, C NE NW 34-33s-14w, dry, TD 5,220 ft.

Barton County: E. H. Adair 1 Merten, NE NE SE 1-20s-14w, dry, TD 3,544 ft.

Chase County: G. Martin 1 Winson, SW SW NW 2-20s-6e, dry, TD 2,532 ft.

Cowley County: Castleberry 1 Stout, NE NE NE 31-30s-7e, dry, TD 2,947 ft.

Graham County: Keating Drilling Co. 1 Minium, SE SE SW 15-9s-25w, dry, TD 4,655 ft.

Jones, Shelburne & Farmer 1 Charlie, SW SW SW 15-10s-21w, dry, TD 3,822 ft.

Logan County: Ashland 1 Briggs Ranch, SE SE SW 14-14s-33w, dry, TD 3,530 ft.

Ness County: Sohio 1 Pfannenstiel, SW SW SW 6-19s-23w, dry, TD 4,315 ft.

Osborne County: Anderson-Prichard 1 Gregory, SW SW NW 3-8s-15w, dry, TD 3,779 ft.

Reno County: The Texas Co. 1 Schmitz, NE SW SE 2-26s-4w, dry, TD 4,298 ft.

Rice County: Dozier 1 Bethers, NE NE NE 27-18s-8w, dry, TD 3,530 ft.

Rooks County: M. B. Armer 1 Rumsey, SE SW NW 15-7s-17w, dry, TD 3,361 ft.

Victor Drilling Co. 1 Coulter, SW SW SW 14-9s-20w, dry, TD 3,740 ft.

Stafford County: Rockett Drilling Co. 1 Moon, SW SW NW 30-22s-13w, dry, TD 3,940 ft.

Trego County: Murfin Drilling Co. 1 Collins, SW SW NW 10-12s-21w, dry, TD 4,100 ft.

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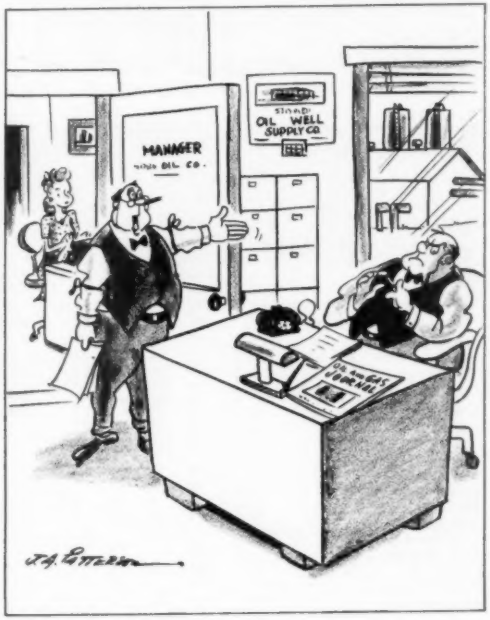

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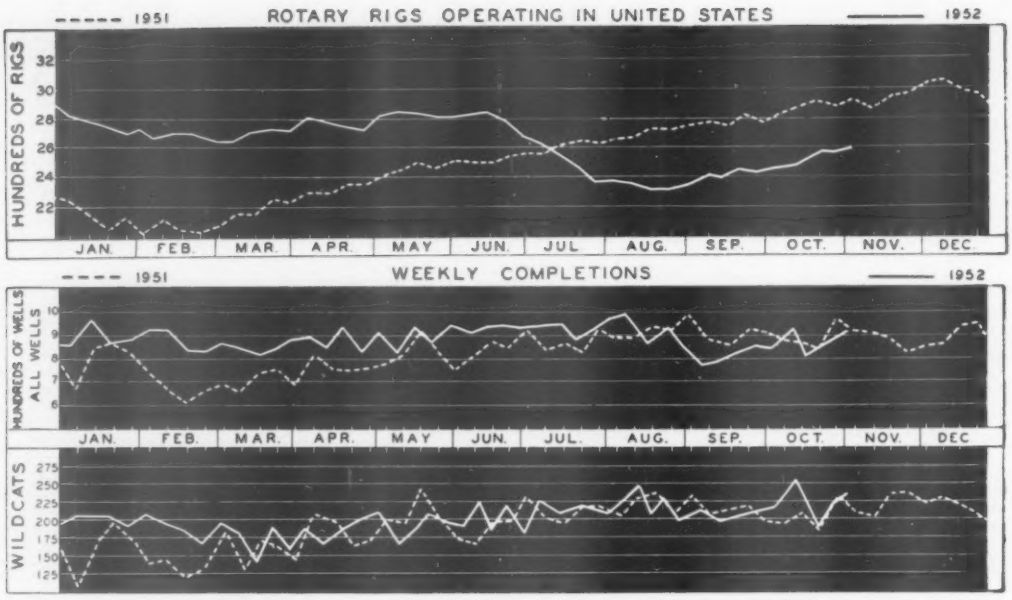


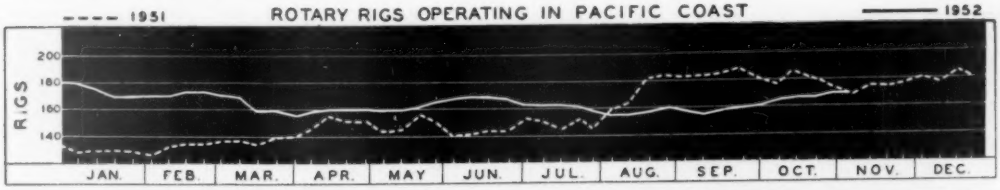
CURRENT STATISTICS

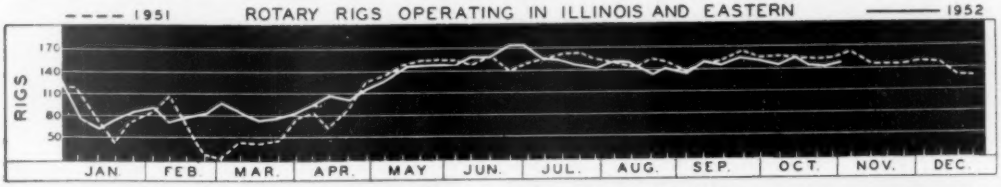
EXPLORATION

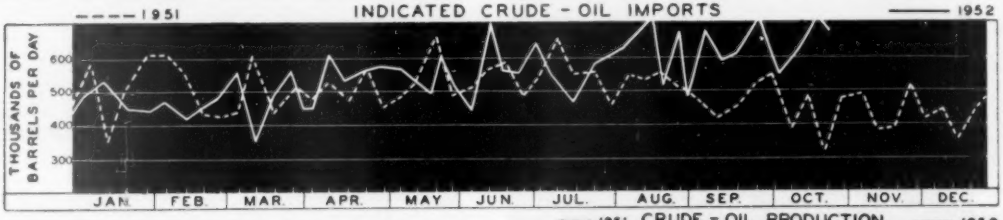
WEEKLY WELL COMPLETIONS . . . WEEK ENDED NOVEMBER 1, 1952

	Total of all wells					Nov. 1		Wildcat completions and discoveries						Cumulative total, 1952				
	Comp.	Oil	Gas	Dry	Footage	1952	1951	Oil	Dist.	Gas	Dry	Total		Oil	Dist.	Gas	Dry	Total
New York	16	8	0	*8	23,500	657	549	0	0	0	0	0		0	0	0	2	2
Pennsylvania	40	21	2	†17	67,757	1,673	1,460	0	0	0	0	0		0	0	0	2	2
West Virginia	16	2	10	4	42,928	524	516	0	0	0	0	0		0	0	4	7	11
Ohio	23	12	5	16	41,866	845	804	0	0	0	0	0		2	0	8	16	26
Indiana	29	5	0	24	56,569	1,058	1,162	0	0	0	11	11		30	0	2	311	343
Kentucky	25	4	9	12	49,977	1,086	1,080	1	0	0	5	6		21	0	1	224	246
Illinois	56	19	0	37	138,156	1,731	2,084	0	0	0	14	14		23	0	1	481	505
Michigan	12	6	1	5	31,178	604	634	1	0	0	3	4		23	0	5	206	234
Kansas	77	39	6	‡32	266,089	3,857	3,685	2	0	1	15	18		86	0	14	633	733
Nebraska	9	2	1	6	38,695	267	189	0	0	0	6	6		11	0	2	148	161
Oklahoma	114	59	6	§49	389,842	4,870	4,643	1	0	1	10	12		85	3	12	509	609
Texas	300	143	8	149	1,341,330	14,431	13,697	11	1	3	93	108		671	45	106	3,270	4,092
North Central (Dist. 7-B & 9)	101	47	0	54	325,906	4,559	4,133	9	0	0	30	39		376	2	24	1,329	1,731
West (Dist. 7-C & 8)	75	51	0	24	420,819	4,365	4,175	2	0	0	14	16		146	1	6	613	766
Panhandle (Dist. 10)	12	6	1	5	46,598	555	588	0	0	0	5	5		4	0	8	52	64
Eastern (Dist. 5 & 6)	22	5	2	15	101,962	766	1,010	0	1	0	10	11		18	5	4	199	226
Gulf Coast (Dist. 2 & 3)	35	13	4	18	219,919	2,164	1,896	0	0	2	8	10		63	26	29	475	593
Southwest (Dist. 1 & 4)	55	21	1	33	226,126	2,022	1,895	0	0	1	26	27		64	11	35	602	712
Louisiana	59	30	6	23	352,299	1,962	1,822	0	0	1	11	12		38	17	13	272	340
Northern	34	16	5	13	118,844	1,078	1,012	0	0	0	6	6		16	0	7	140	163
Southern	25	14	1	10	233,455	884	810	0	0	1	5	6		22	17	6	132	177
Arkansas	9	5	1	3	25,283	342	352	0	0	0	1	1		7	0	0	74	81
Mississippi	6	1	0	5	40,092	285	297	0	0	0	4	4		16	2	1	132	151
Southeastern States	3	0	0	3	25,504	58	46	0	0	0	2	2		3	0	1	31	35
Montana	9	4	1	4	18,962	285	185	0	0	0	0	0		7	0	1	72	80
Wyoming	17	10	1	6	86,858	577	620	0	0	0	4	4		21	0	4	109	134
Colorado-Utah	13	1	1	11	70,810	452	249	0	0	0	10	10		18	0	8	196	222
New Mexico	28	3	13	12	137,045	879	562	0	0	0	6	6		35	2	1	89	127
California	49	32	2	15	223,692	2,054	1,938	2	0	1	13	16		64	0	7	423	494
North Dakota	3	3	0	0	25,478	90	8	0	0	0	0	0		4	0	0	23	27
Miscellaneous	0	0	0	0	0	60	88	0	0	0	0	0		0	0	21	26	47
Total United States	913	409	73	431	3,493,910	38,647	¶36,670	18	1	7	208	234		1,165	69	212	7,256	8,702
Total previous week	868	418	57	393	3,415,613			21	0	5	196	222		1,147	68	205	7,048	8,468
Total November 3, 1951	917	470	64	383	3,613,879			31	1	6	171	209		1,302	70	216	7,062	8,650

Service wells included: *8, †15, ‡1, §7 ¶Revised.



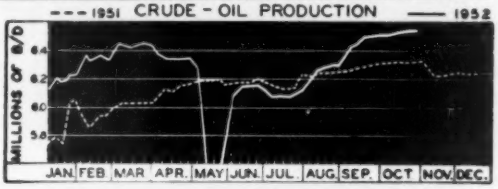


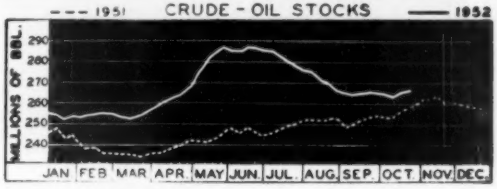


DAILY AVERAGE PRODUCTION FOR WEEK

	November 1, 1952			Oct. 25
	Crude oil	Lease condensate	Total	total
Alabama	3,100		3,100	3,200
Arkansas	75,400	650	76,050	75,900
California	980,200		980,200	981,400
Colorado	87,300		87,300	87,100
Eastern	58,000		58,000	58,600
Florida	1,525		1,525	1,600
Illinois	168,700		168,700	168,000
Indiana	33,600		33,600	33,700
Kansas	344,900		344,900	354,100
Kentucky	31,300		31,300	31,600
Louisiana	643,175	27,600	670,775	670,825
North	109,450	2,100	111,550	111,600
South	533,725	25,500	559,225	559,225
Michigan	36,400		36,400	36,300
Mississippi	91,700	3,750	95,450	95,200
Montana	27,500		27,500	27,100
Nebraska	8,700		8,700	8,300
New Mexico	172,250	400	172,650	172,550
Oklahoma	534,600		534,600	525,200
Texas	2,960,000	42,450	3,002,450	3,002,450
Dist. 1	37,100	200	37,300	37,300
Dist. 2	169,700	4,000	173,700	173,700
Dist. 3	485,100	23,400	508,500	508,500
Dist. 4	272,275	5,000	277,275	277,275
Dist. 5	51,525	250	51,775	51,775
Dist. 6	127,850	3,600	131,450	131,450
E. Texas field	249,000		249,000	249,000
Dist. 7-B	110,850	75	110,925	110,925
Dist. 7-C	172,750	5,400	178,150	178,150
Dist. 8	1,015,025	225	1,015,250	1,015,250
Dist. 9	186,500	275	186,775	186,775
Dist. 10	82,325	25	82,350	82,350
Utah	5,600		5,600	5,500
Wyoming	196,000		196,000	195,000
North Dakota	6,500		6,500	6,100
Total U. S.	6,466,450	74,850	6,541,300	6,539,725
Change from previous week, up			1,575	
Canada	210,575		210,675	205,600
Total U. S. production January 1-November 1			1,892,473,825 bbl.	
Same period last year (crude plus cond.)			*1,877,967,450 bbl.	

*Incl. 24,877,400 bbl. condensate.



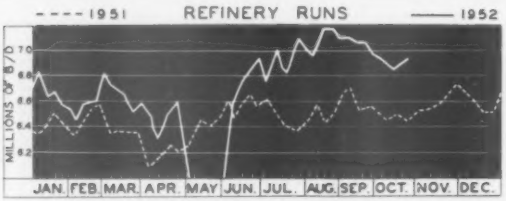


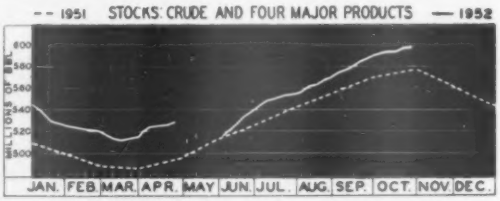
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

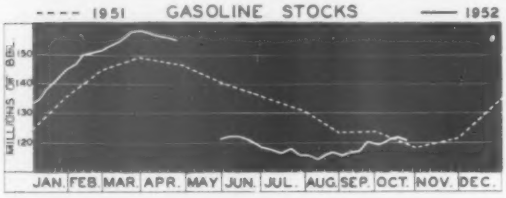
(Thousands of barrels)

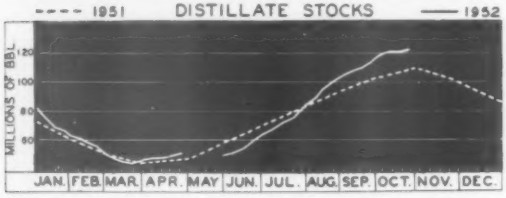
	Oct. 25, '52	Oct. 18, '52	Oct. 27, '51
Pennsylvania Grade	2,219	2,308	2,044
Other Appalachian	2,289	2,101	1,698
Illinois, Indiana, Michigan	12,306	11,926	13,287
Arkansas	2,885	2,975	2,743
Louisiana	15,960	15,729	15,162
North	2,497	2,411	2,859
Gulf	13,463	13,318	12,303
Mississippi	3,054	3,150	3,515
New Mexico	7,748	7,366	7,396
Oklahoma and Kansas	38,233	39,156	39,813
Texas	128,175	127,737	124,075
East Texas proper	12,079	12,591	(†)
West Texas	58,660	58,085	(†)
Texas Gulf	25,683	25,765	(†)
Other Texas	31,753	31,296	(†)
Rocky Mountain	14,707	14,430	13,923
California	31,526	31,452	29,651
Foreign	8,373	8,136	6,545
Total	267,475	266,466	259,852

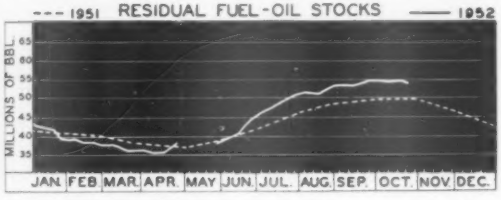
*Bureau of Mines. †Not comparable with current week.









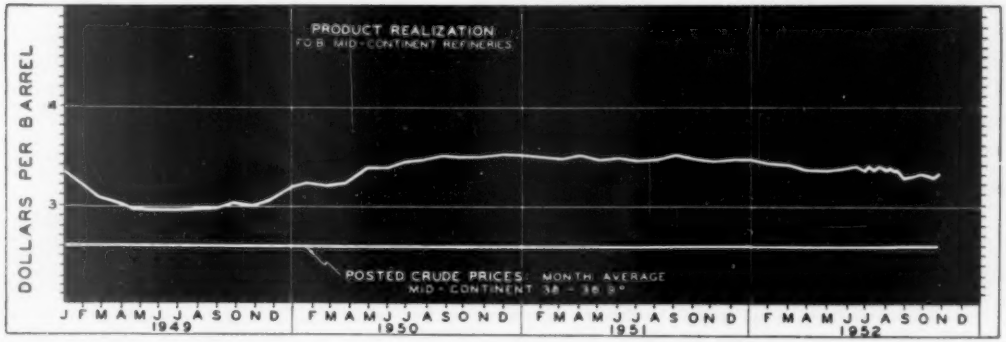


A.P.I. REFINERY REPORT, NOVEMBER 1

(Thousands of barrels)

District—	Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.	Stocks‡ Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, October 1951 Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.
East Coast	1,065	450.0	49.1	236.7	235.3	30,018	14,980	43,619	11,999	975	391.9	39.5	252.8	211.2
Appalachian:														
District 1	89	37.6	5.7	11.4	10.1	3,905	559	1,665	777	103	42.8	5.3	16.4	10.4
District 2	89	34.0	4.9	13.7	16.0	1,781	316	669	368	75	36.8	4.7	9.6	16.6
Ind., Ill., Ky.	1,249	689.3	73.2	225.8	160.3	24,480	7,436	22,521	6,522	1,152	624.3	70.8	190.6	172.2
Okla., Kans., Mo.	554	319.6	10.6	137.1	54.4	11,344	2,167	13,501	1,685	539	286.2	16.9	132.4	61.9
Inland Texas	277	199.3	13.0	53.0	43.9	4,390	422	2,546	1,191	260	183.7	12.7	39.7	41.0
Texas Gulf Coast	1,732	792.3	127.7	416.3	267.8	18,136	3,710	14,086	7,785	1,569	740.6	126.3	336.7	249.1
La. Gulf Coast	539	271.1	73.6	112.6	58.6	6,387	2,679	5,290	2,026	519	243.9	65.4	119.3	57.7
N. La. and Ark.	82	82.7	6.7	18.6	5.6	2,503	759	1,159	300	81	32.4	7.1	16.9	6.3
Rocky Mountain:														
New Mexico	19	11.3		2.9	3.9	116		68	122	17	9.9	0.5	2.5	3.9
Other Rocky Mtn.	196	97.4	4.4	38.6	36.7	3,088	433	2,148	1,044	186	90.9	6.7	35.3	39.7
California	1,001	449.3	0.7	148.6	325.3	14,415	299	12,805	19,473	970	421.8	7.4	143.3	354.0
November 1, 1952	6,892	3,383.9	369.6	1,415.3	1,217.9	120,563	33,760	120,077	53,292	6,446	3,105.2	363.3	1,295.5	1,224.0
October 25, 1952	6,938	3,185.5	356.1	1,504.4	1,213.9	120,767	34,212	121,286	54,101					
November 3, 1951	6,543	3,151.0	391.0	1,318.0	1,256.0	119,563	35,904	110,224	49,724					

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipe lines.


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
DOLLARS PER BARREL
4
3
POSTED CRUDE PRICES - MONTH AVERAGE
MID-CONTINENT 38 - 38.9°
J F M A M J J A S O N D
1949
F M A M J J A S O N D
1950
F M A M J J A S O N D
1951
F M A M J J A S O N D
1952

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate and fuel oil. Realization averaged $3.33 for week ended October 25, $3.28 for previous week, and $3.49 for October 1951. The above trend information is based on volumes and current prices and therefore does not reflect changes in operating costs.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of October 29, 1952. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline, 80-82 octane	10⅜-10½	12.125-12.75	10¾-11
Premium gasoline, 86-88 octane	11⅜-11½	13.25-14.0	11¾-12
42-44 w.w. kerosine	8⅝-9	10.4-10.65	9
No. 2 straw fuel oil	7⅝-8	9.4-9.65	8
No. 6 residual	$0.85-1.00	$2.00-2.25	$1.50-1.75

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	6⅞	6¾	6⅝
Grade 18-55	8.25	7.75	8.0

LUBRICATING OILS
South Texas

200 vis., No. 2-3 neutral	13-13.5
750 vis., No. 3-4 neutral	16
2,000 No. 5-6 neutral	18-19

LUBRICATING OILS
Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	26-27
200 vis., No. 3 neutral, 0-10 pp.	14-15

Western Pennsylvania

145-155 vis., 10 p.t. bright stock	32.5
180 vis., 0 p.t. neutral	31.5

WAX
Mid-Continent

132-134 A.M.P.	5.5

RESIDUAL-FUEL sales in the Mid-Continent area failed to make any substantial gain in the last half of October and the first few days of November. Some interest in December shipments developed at the time that an extended coal strike seemed probable, but in recent weeks sales have been confined mostly to movement against contract to regular customers.

Some heavy fuel is still being offered for resale at $0.75 a barrel with an unconfirmed report that small quantities be bought at $0.725. While some of this material would not be classified as very high-sulfur fuel, it could not be called low sulfur. The general going price in the Group 3 area for good quality No. 6 is about $0.85 spot.

Very little activity is reported for No. 2 fuel in the Mid-Continent. Good material is available at 7.625 cents a gallon, but the fact that little distress material is on the market indicates that suppliers are expecting a better market within the next few weeks and that they have been able to find storage for the surplus so far this season.

Demand for kerosine and No. 1 fuel is showing more improvement than sales of No. 2. Some refiners are using kerosine and No. 1 as a component of jet fuel. This group of suppliers includes some small refiners who otherwise might have trouble moving light fuel at this time of the year.

Gains were reported in retail sales of residual on the East Coast, but this movement did not result in corresponding increases in sales on the spot market. Some interest has developed in fuel to be delivered later in the month.

There is a good possibility that No. 6 prices on the East Coast will trend toward levels slightly under ceilings for the first half of the winter season. One factor will be lower tanker rates. Dirty vessels on the Caribbean-East Coast run are being chartered for the winter at MC base plus 15 per cent.

CRUDE PRICES

GRAVITY SCHEDULE

	Signal Hill, Calif.‡	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.93			
19-19.9	1.98			
20-20.9	2.03	$2.25		$2.12
21-21.9	2.07	2.27		2.14
22-22.9	2.12	2.29		2.16
23-23.9	2.18	2.31		2.18
24-24.9	2.24	2.33	$2.56	2.20
25-25.9	2.30	2.35	2.58	2.22
26-26.9	2.36	2.37	2.60	2.24
27-27.9	2.41	2.39	2.62	2.26
28-28.9	2.46	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.57	2.45	2.68	2.32
31-31.9	2.62	2.47	2.70	2.34
32-32.9	2.68	2.49	2.72	2.36
33-33.9		2.51	2.74	2.38
34-34.9		2.53	2.76	2.40
35-35.9		2.55	2.78	2.42
36-36.9		2.57	2.80	2.44
37-37.9		2.59	2.82	2.46
38-38.9		2.61	2.84	2.48
39-39.9		2.63	2.86	2.50
40 and above		2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico.

Last general price change represented a 50-cent increase, effective December 6, 1947.

‡Standard Oil Co. of California.

FLAT CRUDE PRICES

Representative posted schedules per barrel	
Kettleman Hills, California*	$2.80
Louisiana:	
Beauregard Parish	2.60
Cotton Valley (distillate)	2.85
Cotton Valley (crude)	2.70
Texas:	
East Texas	2.65
Pecos County (Yates)	2.35
Conroe	2.83
Van	2.48
Pennsylvania Grade:	
Bradford	4.25
Southwest Pennsylvania	3.82
West Virginia	3.76
Illinois Basin	2.77

*37°-37.9°.

North Central Texas

(Continued from page 198)

1,088 ft., pay 1,083 ft., IP pumped 63 bbl. 39°-gravity oil, GOR 500 cu. ft.

Cooke County: Carl Sewell 3 Reeves Estate, A. G. Harris Sur., TD 2,336 ft., elev. 808 ft., pay 2,328 ft., IP pumped 41 bbl. 35°-gravity oil.

Coleman County: M. C. Moore 1 Mable C. Yarbrough, B. Ferguson Sur., TD 931 ft., elev. 1,672 ft., pay 922 ft., IP pumped 18 bbl. oil.

Eastland County: Connally-Jackson 1 Albert A. Hanson, Sec. 501, SPRR Sur., TD 4,300 ft., elev. 1,666 ft., pay 3,671 ft., IP 214 bbl. 38°-gravity oil, 16/64-in. choke, TP 110 psi., GOR 380 cu. ft.

Knox County: Southwest Natural Producing Co. 1 Kempner Estate, 99-13-H&TC, TD 5,849 ft., pay sand 5,348 ft., IP 70 bbl. oil in 7 hours, open 2-in. tubing, GOR 1,000 cu. ft.

Jones County: Onyx Oil Co. 1 E. M. Blankenship, Sec. 206, A. Wagner Sur., TD 3,120 ft., elev. 175 ft., pay 3,051 ft., IP 101 bbl. 44°-gravity oil, ¼-in. choke, GOR 78 cu. ft.

Montague County: Jack Grace Production Co. 1 C. McCall, ETRR Sur., A-235, TD 5,907 ft., conglomerate pay 5,899 ft., IP 154 bbl. 41°-gravity oil, TP 240 psi., GOR 310 cu. ft.

Miami Operating Co. 1 J. R. Blevins, T. G. Timmons Sur., A-727, TD 5,945 ft., elev. 921 ft., pay 5,664 ft., IP 414 bbl. 28°-gravity il in 18 hours, 20/64-in. choke, TP 25 psi., GOR 275 cu. ft.

Throckmorton County: Grisham Hunter Corp. 1 J. H. Darden, Sec. 3,047, TE&L Sur., TD 4,238 ft., Caddo 4,228 ft., IP 775 bbl. 40°-gravity oil, ½-in. choke, TP 525 psi., GOR 700 cu. ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: Archer Drilling & Producing Co. 1 Walsh, TE&L Sur. 2,416, dry, TD 1,362 ft.

W. F. Bockhoff 1 Tom Bass, Sec. 2,402, TE&L Sur., A-582, dry, TD 1,267 ft., Gunsight 1,226 ft.

Baylor County: Warren Petroleum Corp. 1 J. J. Simek, 25-45-H&TC, dry, TD 4,648 ft.

Clay County: Sussex Oil Co. 1 A. F. Liggett, Blk. 111, Byers Bros. Subd., dry, TD 1,944 ft.

Coleman County: T. F. Grisham 1 R. L. Bates, Sec. 22, H. Warfield Sur., dry, TD 4,206 ft., elev. 2,035 ft., Gardner 3,810 ft., Caddo 4,102 ft.

J. L. Maxwell and M. W. Freeman 4 Faynett Cooley, Sec. 242, J. Riner Sur., dry, TD 1,000 ft.

Cooke County: Sewell Bros. 1 O. M. Garvin, P. S. Wills Sur., A-1,147, dry, TD 1,953 ft.

Fisher County: C. L. Norsworthy 1 J. C. Stribling, 193-3-H&TC, dry, TD 6,787 ft.

Grayson County: L. O. McMillan 1 L. M. Combs, W. Pierce Sur., A-968, dry, TD 6,152 ft., elev. 791 ft., sand 6,016 ft.

J. R. and Adam Seitz 1 Dora Smith, John Herrod Sur., A-466, dry, TD 5,114 ft.

Jones County: Capital Co. 1-1 T. O. Massey, 3-16-T&P, dry, TD 2,567 ft., elev. 2,567 ft., Gunsight 2,444 ft., Swastika 2,502 ft.

Montague County: Standard Oil Co. of Texas 2 L. T. Mosley, W. D. Lacy Sur., A-418, dry, TD 7,200 ft., elev. 1,200 ft., Caddo 6,295 ft.

Palo Pinto County: Trumter Petroleum Corp. 3 W. E. Brannon, L. A. Bradley Sur., A-1,956, dry, TD 1,602 ft.

Shackelford County: C. B. Christie A-2 Chloe A. Nail, Sec. 108, ETRR Sur., dry, TD 1,336 ft.

W. A. Moncrief and B. C. McMordie 2 J. H. Nail, Sec. 18, ETRR Sur., dry, TD 1,168 ft.

West Central Drilling Co. 1 E. G. Hendrick, Sec. 101, ETRR, dry, TD 1,451 ft.

West Central 1-155 J. H. Nail, Sec. 155, ETRR, dry, TD 1,530 ft.

Stephens County: Terrell Petroleum Co. 2-A J. R. Coody, 66-4-T&P, dry, TD 4,590 ft., elev. 1,481 ft., Strawn 1,951 ft., Caddo 5,330 ft., Ranger sand 3,756 ft., Ellenburger 4,372 ft.

Stonewall County: Alex J. Hickory 1 Gibson, Mitchell Sur., A-412, dry, TD 6,392 ft., Caddo 5,685 ft., Mississippian 6,000 ft., Ellenburger 6,160 ft.

Kewanee Oil Co. 1 Cochran, 235-D-H&TC, dry, TD 6,680 ft.

Taylor County: C. B. Cree and Bay Petroleum Co. 1 E. W. Wilson, 19-1-SPRR, dry, TD 5,000 ft.

Wichita County: Fortex Oil Co. 2 C. W. Bailey, H. Hastie Sur., A-98, dry, TD 1,331 ft.

George W. Graham 2 Prechel, BS&F Sur., 1, A-334, dry, TD 1,836 ft.

Wichita Pipe & Supply Co. 1 S. E. McCullough, Oscar Farrish Sur., Certificate 29, dry, TD 1,561 ft.

Wilbarger County: F. J. Pounds 1-F Pounds-Waggoner, 131-14-H&TC, dry, TD 2,010 ft.

R. Clay Underground 1 W. T. Waggoner, 27-4-H&TC, dry, TD 2,505 ft.

Ted Weiner 2-D Waggoner, Sec. 19, BS&F, dry, TD 2,131 ft.

Frank Wood 1 W. T. Waggoner Est. "Ida," 3-13-H&TC, dry, TD 2,010 ft.

Young County: Taubert & Harper 1 J. Williams, W. C. Adams Sur., A-1,364, dry, TD 3,690 ft.

Trinity Producing Co. 1 W. H. West, Blk. 71, TE&L Sur., A-347, dry, TD 5,228 ft.

Central Area

(Continued from page 209)

at 4,064 ft. Top was logged at 4,052 ft. and up to 2,000 ft. of free oil showed natural after hole was cleaned out following completion with rotary tools, running and setting 5-in. casing. Segerlund this week had staked location for the first new start in this area, the south 40-acre offset, located in the NE SE NE 11-19n-5w. This next well was announced as a Dundee test. Segerlund plans to core the complete Dundee objective, and possibly into the upper Detroit River. If this objective proves to be dry well may be carried to the Richfield, originally announced objective for the 1 Caner et al.

ILLINOIS WILDCAT FAILURES

Clark County: L. G. Ewart 1 Dillier Myers-Freeland, SE NW SE 29-9n-14w, dry, TD 2,323 ft.

Crawford County: Jennings Payne 1 Martin, NE NW NW 29-8n-13w, dry, TD 1,300 ft.

West Drilling Co. 1 Brown, SW SE SW 12-7n-11w, dry, TD 2,826 ft.

Floyd & Henson 1 Apple, SW SE NW 22-7n-11w, dry, TD 1,611 ft.

Clinton County: F. L. Dittmeier 1 Timmerman, NW NW SE 28-2n-4w, dry, TD 2,401 ft.

Clay County: Fred Bippus 1 Valbert, SE SW SE 11-2n-6e, dry, TD 3,174 ft.

Hamilton County: The Texas Co. 1 Harper, NE SW NE 36-4s-6e, dry, TD 3,658 ft.

Marion County: T. G. Glass 1 Spangler, NW SW NE 31-1n-4e, dry, TD 2,945 ft.

Wabash County: Eastern Petroleum Co. 1 Pulnam, NE NW NE 10-1n-13w, dry, TD 2,746 ft.

D. L. Strine 1 Strine-Mundy, NW NW SW 17-1n-13w, dry, TD 2,852 ft.

Wayne County: D. B. Lesh Drilling Co. 1 White, NW NE SW 26-1s-6e, dry, TD 3,250 ft.

Washington County: Carter Oil Co. 1-A Haake, L&N RR, NW NW SW 14-2s-3w, dry, TD 3,142 ft.

White County: Oil Management 1 Baker, SE SE NW 1-4s-10e, dry, TD 3,242 ft.

Buren MacGregor 1 Hon, NE SW SE 18-4s-8e, dry, TD 3,495 ft.

INDIANA WILDCAT FAILURES

Daviess County: E. H. Morris 1 Edwards, NE NE SW 8-1n-5w, dry, TD 1,090 ft.

Gibson County: Coy Oil Co. 1 Meade, Military Donation, 43-1s-10w, dry, TD 1,957 ft.

Greene County: Ronald Miller 1 Bogard, SW SE NW 15-6n-5w, dry, TD 1,700 ft.

Sun Oil Co. 1 Price-Schlott, SW NE SE NW 15-8n-7w, dry, TD 2,109 ft.

Knox County: W. E. Saylor 1 Pielemeier, SW NE NW 32-2n-10w, dry, TD 1,931 ft.

A. W. Rea 1 R. Smith, NE NE SW 21-1n-11w, dry, TD 2,179 ft.

Posey County: E. F. Moran, Inc.-Bushman 1 Weinzopfel unit, SE NW SE 23-6s-12w, dry, TD 2,774 ft.

Calvert Drilling Co. 1 Harlem Comm., NW NW SE 4-7s-13w, dry, TD 2,840 ft.

Spencer County: Lambert & Hood 2 St. Meinrad Abbey, NW SE SW 13-4s-4w, dry, TD 60 ft.

Sullivan County: Illinois Mid-Continent 1 B. Walden, SW NW NE 34-6n-10w, dry, TD 1,572 ft.

Vanderburgh County: Ashland Oil & Refining Co. and C. E. O'Neal 1 Marx, NE NE SW NE 7-6s-11w, dry, TD 2,726 ft.

KENTUCKY SUCCESSFUL WILDCAT

Union County: Eureka Operating et al 1 T. T. Richards, SE SW NE SW 19-O-17, pumped 32 bbl. of oil and 20 bbl. water from Tar Springs from perforations at 1,939-54 ft., TD 2,013 ft. (opens East Shawneetown pool).

KENTUCKY WILDCAT FAILURES

McLean County: J. C. Miller and Ashland Oil & Refining Co. 1 Meredith, SE SE SE SE 22-M-27, dry, TD 2,635 ft.

Chas. Morburger 1 Hine, EL NW NW SW 8-M-30, dry, TD 1,688 ft.

Muhlenberg County: S. D. Jarvis 1 Wickliffe, SW NW NE SW 7-H-28, dry, TD 1,660 ft.

Ohio County: Johnson-Vickers 1 Hoover, SE SW SE 11-M-31, dry, TD 822 ft.

Webster County: National Associated 1 P. McCulley, NE SW SE NE 12-M-23, dry, TD 2,836 ft.

MICHIGAN SUCCESSFUL WILDCAT

Allegan County, Trowbridge Township: Louis Zellman 1 Loebel, SE SE NE 13-1n-13w, Traverse 1,505 ft., 12 bbl., TD 1,508 ft.

MICHIGAN WILDCAT FAILURES

Allegan County, Clyde Township: P. K. Degenther 1 U.S.A., SW NW NW 26-2n-15w, Traverse 1,289 ft., dry, TD 1,322 ft.

Mason County, Hamlin Township: Brazos Oil & Gas Co. 1 Genson & Wheaton, NE SW NW 26-19n-18w, Niagaran 4,313 ft., dry, TD 4,759 ft.

Mecosta County, Fork Township: Chartiers Oil Co. 1 Otterbein & Gardner, NW SW NE 33-16n-7w, Brown lime, 1,359 ft., dry, TD 1,394 ft.

EQUIPMENT MEN . . . in the News

Conway and Chadwick Promoted by Koehring

Two major changes in sales personnel of the Koehring Co. of Milwaukee have been announced by President

J. S. CONWAY

J. E. CHADWICK

Julien R. Steelman. John S. Conway, who was general sales manager, has been named vice president in charge of sales, and John E. Chadwick, with the company since 1945, was named sales manager.

In his new post, Conway will fill the vacancy created earlier this year when Steelman was named president of Koehring. Conway joined Koehring's production department in 1941, after doing engineering and sales work for French Battery Co., of Madison, Wis., and Chevrolet Motor Co. He also served Koehring in the parts and repair department, and was credit manager before being named manager of export in 1945. He became general sales manager in 1948.

Chadwick formerly served for 16 years in all phases of the construction and maintenance department of the Missouri State Highway Department. While at Koehring, he directed the organization of the sales school education program in Milwaukee and in the field, later becoming assistant sales manager.

Ideco Announces Expansion Of Beaumont, Tex., Plant

George W. Walton, vice president of International Derrick & Equipment Co., one of the Dresser Industries, announced recently that in line with long-range expansion plans Ideco is consolidating the Torrance, Calif., manufacturing facilities into those of the Ideco Beaumont, Tex., plant. Walton emphasized that this consolidation does not affect the California Ideco sales or service organizations, which will continue to operate under the direction of C. F. Van Loozen. He also stated that California parts stocks and order service facilities will continue to be available to California users of Ideco equipment.

Pittsburgh Coke Announces Two Division Promotions

Henry L. Hillman, executive vice president of Pittsburgh Coke & Chemical Co., recently announced the appointment of Norman T. Shideler as manager of the protective-coatings division, and the promotion of Arthur E. Gray from assistant division manager to division sales manager. Shideler formerly was technical director of the division.

Continental Appoints New Store Managers

J. A. Mussler, general manager of sales, The Continental Supply Co., Dallas, has announced the appointment of new managers at several stores.

F. E. Amacker, Jr., is now manager of the Harvey, La., store. The Carthage, Tex., store is now under the management of R. M. Bynum. J. L. Powell has been appointed manager of the Liberal, Kans., store. All of these store managers were formerly field salesmen at the stores they now manage.

Twenty-Five Years of Research Play Role in Houdry Process

Eugene J. Houdry's first chemist, E. A. Prudhomme, conducted his pioneering experiments on the application of catalytic processes to petroleum hydrocarbons with apparatus that could just about fit on a kitchen table. From this beginning has emerged the present-day independent research and development organization located on a 7-acre tract in Linwood, Pa. Chalmer G. Kirkbride, president, joined Houdry in 1947 and under his leadership the fundamental research program has been intensified.

As the catalyst is the heart of all Houdry processes, principal effort of Houdry's research department is directed to the development of new catalysts and the improvement of those currently used.

Houdry was first to develop and commercially produce both natural and synthetic catalysts for the catalytic cracking of petroleum hydrocarbons. Other catalysts developed by Houdry have been used in oxidation applications and gasoline treating. Most recent addition to the Houdry family is Type 3 Catalyst, a highly selective catalyst employed in the Houdriforming process to upgrade naphthas and produce aromatics.

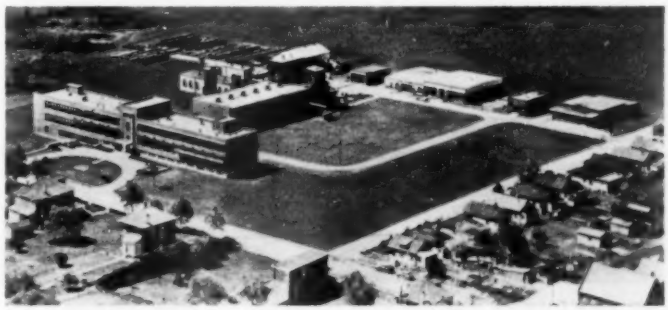
As a result of the information recently gained from basic studies of cat-

E. J. HOUDRY

C. G. KIRKBRIDE

alysis, Houdry chemists developed Type 3 Catalyst, a polyfunctional catalyst capable of promoting dehydrogenation, isomerization, aromatization, hydrocracking, and desulfurization.

Currently, the Houdry Process Development Laboratory operates 15 to 20 pilot units to obtain reproducible



Aerial view of the Houdry research and development laboratories in Linwood, Pa.

data on which to base the designs of commercial installations. Complete facilities are available for Houdriflow catalytic cracking and Houdriforming reforming operations.

Ultimate and probably not too distant goal of Houdry research and development is to reduce catalysis and catalytic operations to an exact science. Then it will be possible to tailor a catalyst and design a catalytic process for a specific need. This in turn results in better and more economical processes. To the refiner it brings nearer the goal of 100 per cent high-octane-gasoline yields obtainable from crude oil.

Midwestern Engine Holds Open House at New Plant

The Midwestern Engine & Equipment Co., Inc., of Tulsa, officially opened the doors of its new $100,000 building on October 22 with an open house for the construction and contracting industry. On October 23, Ted Murrey, president, and Armon Bost, vice president, were hosts to personnel from the drilling and production industry. The following night pipe liners and pipe-line contractors were given an opportunity to look over the modern facilities.

TED MURREY

ARMON BOST

Midwestern's new plant is located on Sapulpa Road near Tulsa. Nearly a quarter of a million dollars worth of contracting, oil-field, and pipe-line equipment was on display during the series of receptions. According to Murrey, approximately 1,000 to 1,500 industry personnel visited the new building during the 3-night celebration.

Midwestern Engine originated as Midwestern Sales in 1945. At that time officers of the firm were O. E. (Ted) Murrey, president; Armon H. Bost, vice president and general manager; and G. O. Glandon, vice president and secretary-treasurer. In 1950 Glandon retired, leaving principal ownership in the hands of Murrey and Bost.

Beginning with exclusive distributorship for Continental Motors and Owens-Corning Fiberglas underground pipe wrap, the company's growth, both in products and services, has been steady and consistent. Present divisions of the firm are: pipe-line supplies and equipment; general contracting equipment, and oil-field supplies and equipment.

The new Midwestern property covers 11 acres of land. The building has 12,000 sq. ft. of floor space, 5,000 of which is completely air conditioned. Administrative, display, parts and materials storage, and indoor equipment repair space is included.

Some of the guests at the three receptions included: H. Gussman, president, Woolridge Manufacturing Co.; R. A. Singler, Woolridge; Dick Wadsworth, vice president of KW Manufacturing Co.; Louis F. Scherer, vice president, Texas Pipeline Co.; William G. Larson and J. Lenahan of Unit Crane & Shovel Corp.; F. E. Stanley, Midwestern Constructors; W. C. Allmand, president, Allmand Manufacturing Co.; W. H. Sedgeman, sales manager, Owens-Corning Fiberglas Corp.; J. E. Poole, sales manager, Keystone Asphalt Products Corp.; T. Leibscher, president, and L. Valdez, factory branch manager, LeRoi Co.; R. H. Rodolf, vice president, Cleveland Air Tools; H. M. Knoerle, vice president, Twinsburg-Miller; C. Wheeler Johnson, vice president, Continental Motors, and Burt Brandana, factory branch manager, Continental.

In addition to the home office in Tulsa, Midwestern operates a branch office in Oklahoma City under the management of J. G. McCray, and five pipe-line warehouses at Tulsa, Oklahoma City, Houston, Kansas City, and Newark, Ohio. Midwestern also maintains a sales representative at Houston, Pittsburgh, Shreveport, Atlanta, and Chicago.

New $100,000 home of Midwestern Engine & Equipment Co., national distributor of pipe-line supplies and equipment.

Acme Oil Tool Co. Promotes Tom Seago

Tom Seago, employed by Acme Oil Tool Co., of Oklahoma City, since 1943 as a fishing-tool operator, has recently been promoted to fishing-tool superintendent.

Seago's experience in rotary and cable drilling dates back 25 years. Previous to his employment with Acme, he worked as a roughneck, driller, tool pusher, and drilling contractor.

Berleth Made Director Of Engineering Training

F. H. BERLETH

D. J. Martin, vice president, engineering, Hughes Tool Co., has recently placed Francis H. Berleth in charge of engineering training. There is a growing need for technically trained personnel in fields of research, product development, and manufacturing. Under Berleth's direction, the company's engineering-training program is being geared to meet this need. The objectives of the engineering-training activity include the recruitment of adequate numbers of engineering personnel at various levels of schooling, such as technicians, graduate engineers, and engineers with advanced degrees; provision of a reserve of engineering personnel in training for more advanced jobs in the organization, and consideration of changes that might be made to more efficiently use engineering people.

Berleth is especially qualified to handle this assignment, since he has been responsible for hiring most of the engineering graduates for the Houston plant since 1925. J. H. Ellison, L. L. Payne, R. H. Nolley, and L. B. Stinson are but a few of the men presently employed in staff or executive positions whom Berleth hired for the company.

Berleth was first employed as a draftsman in 1917. He was appointed chief draftsman in 1925 and served in that capacity until assigned as chief engineer of the aircraft strut plant in 1942. He returned to the main plant in February 1944 and was assigned as manager of design and drafting divi-

(Continued on page 222)

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EQUIPMENT FOR SALE

SALES and rentals of cable drilling and fishing tools, casing and equipment, from the Southwest's largest stock of used cable tools and oil field supplies. Degen Pipe and Supply Co., Tulsa, Oklahoma.

1 Oilwell Steam Pump, 16¼ x 7¾ x 20" 1 Gardner-Denver Steam Pump, 18 x 8 x 30". Both pumps are in excellent condition, may be seen at Makin Drilling Company Yard, Hobbs, New Mexico. MAKIN DRILLING COMPANY, Box 1628, Hobbs, New Mexico.

PIPE FOR SALE
4,000' of 8⅝" 28# Lapweld Casing—good used material. 11,000' of 4½" 10.79# P.E. Lapweld line pipe—ready to run. All material below ceiling prices. Contact Edco Pipe & Supply Co., Box 151, Tulsa, Phone 4-5970.

LARGE National Pumping Unit TH 601 H-40 complete with Cooper Bessemer 40 H.P. Vertical Gas engine, cooler, starter, engine house. Ready to go. Also back crank with extra Jack if desired. Excellent condition. Must be moved now from abandoned wells. Write or phone 6-4847. S. M. Goldschmidt, Box 1052, Wichita 1, Kansas.

FOR SALE OR TRADE
A complete Waukesha laboratory aviation supercharge test engine, ASTM designation D909-47T (3C), with adequate spare parts. Excellent condition. Substantial price saving. Quick shipment. Would consider trade for Cetane equipment. R. H. Armstrong, Republic Oil Refining Company, Texas City, Texas.

LATE Type Portable Power Unit, 300 H. P. LeRoi Gas Engine, 8 Cy., 6¾ x 7—Model RXIV. Complete with Electric Starter and Cooling System. DC to 160 KW, 0-600 Volt Generator with Auxiliary 36KW, 230 Volt Generator. We will sell engine separately, if desired. Brazos Engineering Company, 224 Raines Street, Houston, Texas. Phone: FAirfax 8367.

USED EQUIPMENT

1—Bethlehem Pumping Unit
35 HP—19000# Polish rod load
W/ ZC 503 F&M Gas Engine

2—Ideco Pumping Units
44 HP—19000# polish rod load
1—W/ 739 F&M Gas Engine
1—W/ 503 F&M Gas Engine

1—Tank Battery, 4—250 bbl. tanks
10'x20' Nt'l Treating System
2½'x10' Nat'l Separator

1—Tank Battery, 2—210 Bbl. tanks
2½'x10' Nat'l Separator

CASING—TUBING—LINE PIPE

BROWN PIPE AND MACHINERY COMPANY

1311 W. T. Waggoner Bldg.
Phone ED 9628, Ft. Worth, Texas

EQUIPMENT FOR SALE

WELL drilling equipment, new or used spudders, rotaries, core & shot hole drills tools, pipe, bits, blocks, pump jacks, valves Everything for well drilling and service Fishing tools rented. Pressey & Son, Pueblo Colo.

I-90 H.P. 2 Cycle Superior direct connected compressor with high and low cylinders with intercooler ready to run. Box 546, Telephone 1060. Bartlesville, Okla.

ONE Emsco-500 equipped with 1-year old 2505 Buda Diesel Engines, Lee C. Moore triple jackknife mast with substructure. Shaffer blowout preventer, steel mud tanks, Kelco power slips, 8,000 ft. 4½-in. drill pipe with Reed Shrink Grip tool joints. Rig is complete, in good condition, ready to run Box G-125, The Oil and Gas Journal, Tulsa Oklahoma.

GAS METERS FOR SALE. Westcott, Foxboro and Emco. Good condition. Geo. R. Milner, Box 124, Okmulgee, Oklahoma.

Gaso Duplex 4½" x 6" Power Pumps with Chrysler C-56 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units

H. H. COFFIELD
Attn.: W. H. ORR
Phones: 132—Rockdale, Texas
AT-3427—Houston, Texas

EQUIPMENT FOR SALE

FOR SALE: One 36-L Bucyrus-Erie drilling machine, complete with tools. Also 1,942 ft., new 7 inch, 17 lb., H-40, range 2, seamless casing and 2,400 ft. of new 2⅜ inch 4.60 lb., range 2, J-55, seamless regular tubing. Box E-812, The Oil and Gas Journal Tulsa, Oklahoma.

FOR SALE: Regan Crown Blocks, Type EM, 5, 6 and 7 sheave 1¼" and 1½" grooved 300 and 500 ton capacity. 3—18 X 8 X 20 Gardner-Denver Mud Pumps. 5005 Holmes Road, Houston, Texas. Phone OL-2636.

FOR SALE

MODEL 1050 IDECO RIG

Powered With

Three G-M Twin Diesels

136 Ft. Lee C. Moore, Heavy,

Wide-Base Mast

4½" Grade E Drill Pipe with Hard Bands Drilled Four Gulf Coast Wells.

Rig is Complete and in Good Condition.

Write Box G-166, The Oil and Gas Journal, Tulsa, Oklahoma

FOR SALE

Ingersoll-Rand Type 2XVG1, 75 H.P., Heavy Duty, Direct Connected 4 cycle, Gas Engine driven, Single stage Gas Compressor.

Power cylinders 2—11 in. dia. x 12 in. stroke
Compressor cylinder 1—12 in. dia. x 12 in. stroke

Complete with starting air compressor and automatic appurtenances, capable of handling 875,000 cu. ft. per day.

Purchased in September 1949, completely new, and in good operating condition. Also meters, runs, drips, heaters and other equipment necessary for small gathering system.

ROOSEVELT OIL AND REFINING CORP.

P. O. Box 271 **Mt. Pleasant, Michigan**

DRILLING EQUIPMENT FOR SALE

Emsco EC Drawworks with hydromatic brake, two automatic catheads.
Emsco J-1250 compound transmission for three engine drive, with pump takeoff pulley equipped with 24" Fawick clutch; air compressor mounted on compound case.
5—Cummins Diesel Engines, Model LP 600, each with 18" double Twin Disc clutch.
2—Emsco Type JA reverse gears.
1—National Rotary 3 speed gear box, equipped with 18" Twin Disc clutch.
1—Steel skid base for three engines, 18" high.
1—Steel base for Emsco Reverse Gear.
Equipment may be inspected at our yard at 3465 Cherry Avenue, Long Beach, Calif.

THOMAS P. PIKE DRILLING CO.

417 South Hill Street **Los Angeles 13, California**

EQUIPMENT FOR SALE

FOR SALE: 36L Bucyrus-Erie Machine, complete with Tools, Steel Dog House, etc. Located Farmington, New Mexico. Priced at $16,500.00. First National Bank, Borger, Texas.

NOW working in South Texas area, Cardwell "Mobilhoist" double-drum workover rig powered with Waukesha gas-gasoline 6 MZR engine. 5000' Rig complete with 5000' ⅞" swab line, 1" drill line Brewster 50 ton three sheave block and hook, 7" x 5½" double telescoping 53' pole. Complete with O.C.T. packoff for 2" and 2½" tubing, substructure, hand tools, weight indicator, etc. Less mud pump. Price $6500.00. Box G-167, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE

Good Used 48-L and 36-L Bucyrus-Erie Drill with or without Tools.

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Box 398, Pampa, Texas Phone 3377

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1¼" PRESSURE and TEMPERATURE RECORDERS

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2—Type #97802 Byron Jackson Centrifugal Pumps, 4-Stage, 6" x 18" Impellers, 1300 GPM, 900 Ft. Head, 330# Pressure, 45,000 BPD, Mounted on Cast Iron Base for Electric Motor Drive, Good Condition. Price F.O.B. Tulsa, Oklahoma, each $850.00

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1—Practically New Figure #1849, 2½"-x 4" x 6" Gaso Duplex Piston Power Pump, 88 GPM at 350# Pressure, 4" Liners. Powered with 30 H.P. GE Electric Motor 3-60-440, Complete with V-Belt Drive, Mounted on Steel Skid, Unit Used to Test Valves. Price F.O.B. Tulsa, Oklahoma, each $1250.00

H. A. McCarthy

310 Thompson Bldg., Tulsa, Okla.

EQUIPMENT FOR SALE

OIL Field Casing, New 5½" and 7" German casing from Houston storage. Immediate delivery. P.O. Box 929, Houston, Texas.

OIL WELL CASING, TUBING, DRILL PIPE AND LINE PIPE. Brand New, Mill Reconditioned and A-1 Used Oil Country Tubular Goods available in any quantities required by end-users and not for resale. GAS CORPORATION, 333 N. Michigan Ave., Chicago 1, Ill.

FOR SALE: R. L. Cardwell with HXE Hercules Engine, 1st class condition, $6,500.00. Fred Cooper E 563 Winch Tractor, Single Drum mounted on six 75-inch Tires, 50 ft. mast, fine condition service 5,500 feet of 2⅛ inch upset tubing. Box 1215, Tulsa. Phone 5-8850.

FOR SALE: 2,000 8⅝" O.D. 8 V Thread used recessed collars cleaned priced $1.50 each; 1500 12¾" O.D. Used 8 V. thread recessed cleaned priced $5.00 each, both in excellent condition, will forward samples if desired. A. A. Gilbert Pipe & Supply Co., Shreveport, La.

FOR SALE: Walker-Neer 32-Special new in March 52, complete with all top-to-bottom tools, new lines and 1952 G.M.C. truck. W. H. Bass, phone 1376, Mt. Carmel, Illinois

FOR SALE to highest bidder to close estate. 314C Failing Rotary Drill mounted on G.M.C. Truck with Gardner-Denver 4½ x 5 pump, 930 ft. drill pipe. 500 gal. water tank mounted on Ford 4 x 4 Truck. Core barrels, elevators, spiders, etc. All in good shape. For inventory contact Walker Bank & Trust Company, Salt Lake City, Utah.

FOR SALE at our Okla. City Whse.: 60,000' of 4½" OD Used PE Beveled Line Pipe, 25,000' of 3½" OD Ditto 30,000' of 6" Standard PE Used Line Pipe. All Single Lengths. Cities Service Oil Co., Patridge, Bartlesville, Oklahoma.

COUPLINGS For Sale: 10,000 6⅝" OD used 8V API line pipe couplings @ $1.25 each, 10,000 8⅝" OD used 8V API line pipe couplings @ $1.50 each, 2,000 10¾" OD used 8V API line pipe couplings @ $6.00 each. F.O.B. Breckenridge, Texas. All couplings clean and in first class condition. Contact Oil Field Salvage Company, P. O. Box 812, phone 232, Breckenridge, Texas.

PIPE

All sizes; line pipe and casing, tanks, and Oilfield supplies. Edco Pipe & Supply Co., Phone 45970, P.O. Box 151, Tulsa, Oklahoma.

WANT EQUIPMENT: Did you find the equipment you wish to purchase in this column? If not, use an "Equipment Wanted" classified advertisement to find it. It is available somewhere and Journal classified advertisements will find it. See box heading for classified rates, or write The Oil and Gas Journal.

EQUIPMENT WANTED

WANTED: Three engine compound for Wilson Titan drawworks. Makin Drilling Company, Box 1628, Phone 3-3141, Hobbs, New Mexico.

WILL BUY, Used, Late model Bucyrus 22-W (with 40' mast). R. F. Hare, 2018 W. T. Waggoner Bldg., Ft. Worth, Texas.

WANTED: Complete light rotary equipment. Prefer Unit 34 or 15 draw works or equivalent, with L. C. Moore derrick. Immediate reply appreciated; cash. K. C. Morton, Choteau, Mont.

WILL PAY highest prices for used casing, used line pipe, abandoned leases, or other surplus lease equipment. Your idle producing equipment is worth dollars. Green Pipe & Supply Co., Box 1383, Tulsa, Oklahoma.

WANT 7¼ x 12 used Emsco, Gardner-Denver, Oil Well or Lucy mud pump—late models only that are in good shape. R. F. Hare, 2018 W. T. Waggoner Bldg., Ft. Worth, Texas.

WANTED: Oil Well Casing, Tubing, Drill Pipe and Line Pipe, new, reconditioned and A-1 Used. Give complete description, price and location. GAS CORPORATION, 333 N. Michigan Ave., Chicago, Ill.

WANTED: Laboratory Equipment, ductility apparatus. Send full particulars to Wisconsin Oil Refining Co., Sheboygan, Wisconsin.

EQUIPMENT NOT IN USE: Did you find a buyer in this column for the equipment you have for sale? Someone wants it and an "Equipment For Sale" classified advertisement in the Journal will find a buyer. See box heading for classified rates or write The Oil and Gas Journal.

WANTED TO PURCHASE
All Sizes Standard Black Pipe

3" Used	6" Used
4" Used	8" Used
5" Used	10" Used
12" Used	

Submit your offerings in mixed or straight carload quantities and we will arrange for immediate inspection and offer highest prices.

Write—Wire—Phone

SONKEN-GALAMBA CORPORATION

2nd and Riverview (X-889)

Kansas City 18, Kansas

THatcher 9243

EQUIPMENT WANTED

EQUIPMENT WANTED

For Immediate Delivery

Centrifugal Blower

Capacity Range: 30,000-45,000 CFM Air.

Suction Pressure: Atmospheric.

Discharge Pressure: 25 lbs. per sq. in.

Direct connected to Condensing Steam Turbine.

Steam Pressure: 150 lbs. per sq. in.

Exhaust Pressure: 4" Hg. Absolute.

Write, giving full specifications and price to Box G-170, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

WELL integrated oil company, operating in the Mid-Continent and Rocky Mountain areas, is interested in a capable and experienced geologist with sufficient geologic background and experience in exploration to assume the position of Manager of Exploration and Geological Departments. Salary open. All replies will be held in strict confidence. Box G-146, The Oil and Gas Journal, Tulsa, Oklahoma.

CHIEF PROCESS ENGINEER
Progressive, expanding refinery in Houston area desires Chemical Engineer experienced in Petroleum refining to assume duties as Chief process engineer, must be a leader and assume full responsibilities of position. Salary commensurate with experience. Address replies giving experience, salary desired, etc., to Box G-159, The Oil and Gas Journal, Tulsa, Oklahoma.

REGISTERED professional engineers experienced in evaluation oil and gas properties by major oil company headquarters Tulsa. State experience and qualifications. Box 521, Tulsa, Oklahoma.

SEISMIC PERSONNEL needed for United States and Canada by well known and expanding contract geophysical company. Address Box E-863, The Oil and Gas Journal, Tulsa, Oklahoma.

INSTRUMENT man with refinery experience to install and maintain instruments, topping, cycloversion, thermal cracking. Box G-154, The Oil and Gas Journal, Tulsa, Oklahoma.

ASPHALT PLANT CHEMIST. Young man with Ch. E. degree desired. Minimum of three years of oil refinery experience essential. Must be capable of assuming responsibility and supervising all laboratory testing for 5,000 B.P.D. refinery located in central Southern state. Salary commensurate with training, experience and ability. Excellent opportunity for right man. Forward personal history and experience data to Box G-156, The Oil and Gas Journal, Tulsa, Oklahoma.

WELL integrated oil company, operating for the most part in the Mid-Continent and Rocky Mountain areas, is interested in man with executive background and ability to assume position of Vice President in charge of Exploration, Production, and Land Departments. Position open due to retirement of present head involving reorganization. Marvelous opportunity for right man with sufficient qualifications. No other need apply. Salary no object. Box G-147, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED
EXPERIENCED PETROLEUM ENGINEER

Specializing in study of OIL AND GAS RESERVES. Large independent oil company located in Tulsa, Oklahoma. In writing give full particulars as to personal history, academic qualifications, practical experience, references, and salary expected. All communications confidential.

Box G-157

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

. . CHEMICAL . .
ENGINEER
or
CHEMIST

Major Company has opening in Venezuela for Chemical Engineer or Chemist with experience in operation of Podbielniak Column.

Prefer also experience in operation P.V.T. equipment but not essential requirement. $7160 annual earnings plus maintenance.

P. O. BOX 35
Bowling Green Station
New York 4, New York

HELP WANTED

MANUFACTURERS representative for established line of oil field specialties in North Texas, Panhandle and West Texas-New Mexico area. Advise experience, lines now being handled and territory covered. Box 2632, Tulsa, Oklahoma.

WANTED: Experienced contact man to represent well established oil field service company in West Texas. Prefer background of petroleum engineering or geology. Excellent opportunity. Please write brief letter giving qualifications. (Our employees know of this ad). Box G-141, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL Industry Employment Service, 405 Tuloma Bldg., Tulsa, Okla. 4-5974. Tom Robinson, owner. For Technical and Trained Personnel, including LPG.

PRODUCTION superintendent for Michigan with some administrative experience. Should be familiar with leasing and arranging for drilling contracts. Give data on experience, salary requirements, personal history and previous associations. Box G-163, The Oil and Gas Journal, Tulsa, Oklahoma.

THOROUGHLY experienced top to bottom cable tool drillers Rocky Mountain experience preferred but not necessary. Bucyrus rigs. $2.00 per hour, time and half overtime, year-round work for sober trustworthy men. Telegraph or write where can contact will reply immediately. DAKOTA BASIN DRILLING CO., Hot Springs, South Dakota.

BUYER
Integrated oil company in Oklahoma has excellent opportunity for qualified applicant. Must have experience in production; also sales experience in heavy equipment would be helpful. College degree, including petroleum and mechanical engineering and some business administration. Age 26-33. All replies should contain salary required and recent photograph. Box G-165, The Oil and Gas Journal, Tulsa, Oklahoma.

THE POSITION YOU WANT: Oil industry companies are looking for men to fill every conceivable kind of position. If you didn't find the position in this column that you are looking for, use a "Situation Wanted" classified advertisement to state your qualifications. Some company is probably looking for your ability. See box heading for classified rates or write The Oil and Gas Journal.

SITUATIONS WANTED

DRILLING and Production Superintendent, 23 years varied experience. Excellent references. Box G-160, The Oil and Gas Journal, Tulsa, Oklahoma.

PRODUCTION SUPERINTENDENT - PETROLEUM ENGINEER. Oklahoma University. 11 years responsible operational and administrative experience. 5 years sales and management technical services and tools. 4 years assistant general superintendent drilling and producing. 2 years general production manager Kansas and Rocky Mountains. Experienced leases, deal negotiations, geological and engineering evaluations, drilling and producing operations, sales and management. Will carry load and earn way with established, active organization operating Mid-Continent or Rocky Mountains. Age 38. Details without obligation. Box G-115, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

AIRLINE Transport Pilot, 45, Radio and Electronics Engineer, with 20 years executive experience. Excellent references. Contact R. Z. Glass, 4701 Linden, Bellaire, Texas.

PETROLEUM GEOLOGIST, M.S., Oklahoma University, three years' varied experience, major company, Illinois basin, subsurface mapping, well sitting, some production work, some water flood planning, desires responsible position with progressive independent in Rocky Mountain area or Illinois basin. Box G-164, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL AND GAS Executive, 20 years experience, desires locate Denver, Colorado, area. Adequately qualified all phases petroleum except field work. Box G-161, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM Engineer, Production Superintendent. 6 years experience Gulf Coast area, drilling and production. Desires position with active organization. Box G-148, The Oil and Gas Journal, Tulsa, Oklahoma.

ASSISTANT REFINERY SUPERINTENDENT desires to relocate. 6 years in present position of responsibility for both process and mechanical phases of all refinery operations. Experienced in operation of fluid catalytic cracking units. Chemical engineering graduate, 9 years experience in process development, process design and technical service work for well-known engineering and development organization. Box E-945, The Oil and Gas Journal, Tulsa, Oklahoma.

PURCHASING-Materials-Sales-Office mgt., 18 years experience petroleum and industrial equipment with large oilfield supply company consider any location or foreign. Age 39. Box G-168, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED Geologist, age 36, Masters degree, desires to relocate with small active independent preferably in Rocky Mountains or Texas. Seven years diversified experience in geology and well engineering in Southwest Texas, Mississippi, Louisiana and Alabama. Also experienced commercial pilot. Presently employed by large independent. Box G-169, The Oil and Gas Journal, Tulsa, Oklahoma.

ACCOUNTANT (MBA University of Oklahoma) seeks opportunity not security with drilling contractor, independent producer or Allied Industry in Oklahoma City area. Box G-162, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED in land and contact work, desires connection with oil or drilling company, or selling in related fields. Free to locate anywhere. T. H. Kerlin, 200 Monticello, Odessa, Texas. Phone 7-3608.

CONSULTING ENGINEER. Available for fee or retainer representation in Rocky Mountains, Permian Basin, and Kansas. Evaluations and Supervision of Royalty or Operating Interests. Geological Reports and Deal Negotiations. References. Box E-968, The Oil and Gas Journal, Tulsa, Oklahoma.

THE RIGHT MAN: Can you fill the position you have open from the qualifications listed in this column? Men are always looking for an opportunity to improve themselves. Use a "Help Wanted" Journal classified advertisement to find the men you need. See box heading for classified rates or write The Oil and Gas Journal.

PRODUCTION WANTED

PRODUCTION WANTED

"IS THIS THE TIME TO SELL YOUR PRODUCTION?"

Payment of capital gains tax today, nets you an amount almost comparable to your ultimate net realization (after taxes and depletion).

If you should consider selling—**WE WANT TO BUY,** as cost depletion will give us an entirely different tax basis. We are reliable and financially responsible producers. Bank references will be readily furnished. **We are not brokers.**

Also interested in drilling proposals with geological merit. We are not interested in Conversation, we want to buy or drill. Please submit your proposals and they will be given courteous, prompt and business-like attention. All inquiries will be held in strictest confidence.

BOX G-109, THE OIL AND GAS JOURNAL, TULSA, OKLAHOMA

SITUATIONS WANTED

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No 1628, Ph. No. 3-3141, Hobbs, New Mexico.

CHEMICAL Engineer, married, age 41, with heavy experience in project engineering and operation desires position of major responsibility. Box G-153, The Oil and Gas Journal, Tulsa, Oklahoma.

LEASE AND DRILLING BLOCKS

FOR SALE: Approximately 300 bbl. production per day, with a potential of several times as much. It has a dozen different pays, favorable for flooding. Also drilling, cleaning, and servicing machines, trucks and tools. Must be a bonafide company, no broker. Major Company, preferred. Box G-158, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE, BARGAIN: 69 acres, 10 year lease Shelby County, Texas, surrounded by major companies, $3.50 per acre. C. A. Parker, Center, Texas.

WILL pay cash instantly for leases (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2183, Denver, Colorado.

MONTANA—Newly proven oilfield, 5000 acres. Excellent seismic data. Depth 2600 to 3100. Best offer takes. K. C. Morton, Choteau, Montana.

ACREAGE: New South Dakota wildcat, good geology, title work completed, portion landowner royalty for sale. Commence first test about November 1. For full details, write Box 822, Watertown, South Dakota.

NOTICE OF SALE

The trustees of Gonzales Land & Royalty Company (Unincorporated) offer for sale upon sealed bids to be opened on November 14, 1952, at its office in Gonzales, Texas, all of its assets in bulk, including a large number of producing and non-producing mineral and royalty interests. More detailed information will be furnished upon request directed to Box 237, Gonzales, Texas. The trustees expressly reserve the right to reject any and all bids. Boyce Penrod, Office Manager.

SEE A. L. BOWLES, Ada, Oklahoma, for attractive drilling deals.

LOOKING FOR A LEASE? There will be over 40,000 wells drilled this year. If you are looking for a lease, drilling block, or drilling deal and haven't found it in this column, or if you have a lease or drilling block you want drilled, a Journal classified advertisement can find an interested party. See box heading for classified rates, or write The Oil and Gas Journal.

SOUTHERN GRAY COUNTY, TEXAS

Approximately 4500 acres solid block semi-proven dolomite production around 3000'. Full 7/8 leases 5 year $1.00 rental. Small cash bonus and little override. Both oil and gas.

COMBEST ROYALTY COMPANY
Amarillo, Texas

DALLAM COUNTY, TEXAS

8000 acres wildcat solid block NEW 10 year commercial leases $1.25 bonus $1.00 rental. Major Companies now leasing in this County.

Combest Royalty Company
Amarillo, Texas

LEASES ROYALTIES

Producing and Nonproducing
Bought and Sold—Any Area
Inquiries Invited

B. D. BUCKLEY
6035 Delmar Ave., St. Louis 8, Mo

ROYALTIES

WILLISTON BASIN ROYALTIES

Dealers in Montana royalties since 1921, we now specialize in royalties under major company leases in the Montana portion of the Williston Basin. For information on our method of operation, write LANDOWNERS ROYALTIES COMPANY, Box 1225, Great Falls, Montana.

JACK EAGLE—Pay you immediately for your producing royalties and Overrides, absolutely no delay, send complete details. 706 City Nat'l Bldg., Okla. City, Okla. REcent 6-7027

GET TOGETHER: Both Capital and Royalties are available. If the investment proposition you want isn't listed in this column use a Journal classified advertisement to find it. See box heading for classified rates or write The Oil and Gas Journal.

REAL ESTATE

SPACE IS NEEDED: A Journal display classified advertisement is the quickest way to rent or sell your real estate. In the present period of expansion oil industry firms urgently need the space you have available. If it isn't listed here, you may also find it by stating your needs in these pages. For classified rates see box heading or write The Oil and Gas Journal.

REWARD OFFERED

STOLEN!!! New christmas tree valve from Central Pennsylvania. 10,000# test. Serial No. 51-52-10-1044. Manufactured by Oil Center Tool Company. $500.00 reward information. Box C-124, The Oil and Gas Journal, Tulsa, Oklahoma.

BUILDING SPACE

BUILDING FOR LEASE, Midland, Texas, will construct office building for long term lease. On Highway 80, excellent parking. Floyd Young, Stamford, Texas.

EXPLORATION SERVICE

AERIAL SURVEY PHOTOGRAPHY

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EQUIPMENT MEN

(Continued from page 218)

sion, product-engineering department. In 1949 he was appointed assistant chief engineer and held this position until recently appointed director of engineering training.

Conners Is Named to High Post by Graver Tank

E. N. Gosselin, president of Graver Tank & Manufacturing Co., Inc., East Chicago, Ind., has announced the appointment of Harold C. Conners as assistant to the president.

Conners, a graduate mechanical engineer, has been associated with Graver for more than 16 years, most of which were spent in the sales-engineering department. Early in his career Conners served as manager of Graver's bulk tank sales and later as chief engineer of the company's Sand Springs, Okla., plant, and has served as manager of sales for the Chicago division.

Evans, Sarraf Promoted to New Engineering Posts

H. J. EVANS

The appointments of Howard J. Evans as chief engineer, and Robert J. Sarraf as chief chemical engineer has been announced by N. W. Rowand, general manager of Rockwell Manufacturing Co.'s meter and valve division. In 1935 Evans joined Rockwell as an engineer at its Pittsburgh headquarters, and was later appointed assistant chief engineer for gas products. In 1948 he was made chief engineer of Rockwells' DuBois division, and 3 years later he returned to Pittsburgh as chief engineer for gas products, a position he held until his recent appointment. Prior to his affiliation with Rockwell, Evans was employed in the geophysical departments of Humble Oil & Refining Co., and Standard Oil Co. (N. J.).

In addition to his new duties, Evans will continue as chief engineer for gas products, and will be assisted by Richard F. McCormick, chief products engineer for gasoline and oil products; Bernard Last, development engineer on lubricant accessories, and W. S. McLay, chief draftsman.

Sarraf is a graduate of University of Pittsburgh with a B.S. degree in chemical engineering. He later served over 3 years as a chemical engineer on research and development projects at the Mellon Institute of Industrial Research. In 1947 he joined Rockwell as a chemical engineer at its Pittsburgh headquarters, a position he held until his recent appointment. In his new position, Sarraf will be assisted by L. M. Van der Pyl, chief chemist.

Murken Made a Divisional Manager at Quaker Rubber

F. P. Murken has been appointed manager, industrial hose division, Quaker Rubber Corp., Division of H. K. Porter Co., Inc., Philadelphia, it has been announced by G. A. Dauphinais, vice president and general manager.

Murken, in his new position, will be in charge of sales for all types of industrial hose manufactured by Quaker. He joined Quaker in 1944, and has held various positions in both sales and technical service. Until his present appointment, he has been manager, wrapped-hose division, where he had developed new types of materials-handling hose.

Rocky Mountain Area

(Continued from page 210)

Weston County: W. F. Lacey 1 Magee, NW NW SW 22-45n-64w, dry, TD 4,750 ft.

Wildon 1 Government, NE NW NE 4-48n-66w, dry, TD 487 ft.

COLORADO WILDCAT FAILURES

Logan County: Vaughey & Vaughey 1 Strouse, C NW SE 28-9n-53w, dry, TD 5,501 ft.

F. Kirk Johnson 1 W. K. Priest, NE NE NE 30-11n-55w, dry, TD 5,930 ft.

Morgan County: Roden, Darden & McRae 1 Findeis, C NE NW 23-1n-55w, dry, TD 4,997 ft. temporarily abandoned.

LaGloria Corp. 1 Federal, C SE NW 26-4n-55w, dry, TD 5,361 ft.

Washington County: Anderson-Prichard Oil Co. 1 Simpson, SW SW NW 19-1s-54w, dry, TD 5,255 ft.

Amerada Petroleum Corp. 1 Donald 5 Strat test, SW SW NE 4-3s-49w, dry, TD 4,270 ft.

Hanco Oil & Gas Co. 1 Sperry, NW NW SW 1-4s-55w, dry, TD 5,187 ft.

Kewanee Oil Co. 1 Bailey, NE NE SW 19-5s-55w, dry, TD 5,441 ft.

WESTERN NEBRASKA WILDCAT FAILURES

Deuel County: Ralph Colling 1 Kuehne, SW SW NE 14-13n-42w, dry, TD 3,500 ft.

Cheyenne County: W. M. and A. P. Fuller 1 Rush Creek Land & Livestock, SW SW SE 7-15n-46w, dry, TD 4,182 ft.

W. M. and A. P. Fuller 1 Miller, SE SE NW 13-15n-47w, dry, TD 4,274 ft.

J. M. Huber 1 Jurgens, SE SW NW 5-15n-48w, dry, TD 4,680 ft.

Joe Dunbar 1 State, SE SW SW 36-15n-48w, dry, TD 4,429 ft.

Grant County: S. D. Johnson 2 Abbott, SE SW NE 32-24n-40w, dry, TD 3,824 ft.

UTAH WILDCAT FAILURES

Garfield County: The California Co. 2 Unit, NW NW NW 8-37s-2e, dry, TD 7,114 ft.

Uintah County: The California Co. 1 Unit, C SE SE 18-7s-22e, dry, TD 6,878 ft.

NORTHERN NEW MEXICO WILDCAT FAILURES

San Juan County: El Paso Natural Gas Co. 1 English, NE SW NE 1-23n-9w, dry, TD 6,378 ft.

Magnolia Petroleum Co. 1 Not-ti-nus-wood, N½ SW SW 1-24n-9w, dry, TD 6,590 ft.

LEGAL

Sealed bids for Oil and Gas Mining Leases on restricted Tribal and Allotted lands of the Fort Berthold Indian Reservation, North Dakota, will be received at the Office of the Superintendent of the said reservation, Elbowoods, North Dakota, until 2:00 P. M. **Central Standard Time** on November 17, 1952, and will be opened immediately thereafter in the presence of such bidders as may attend. This sale will be conducted under regulations as amended and promulgated by the Secretary of the Interior, 25 CFR 189 (Act of March 3, 1909, 35 Stat. 781, 783; 25 U.S.C. 396) governing the leasing of Allotted lands and 25 CFR 186 (Act of May 11, 1938, 52 Stat. 347; 25 U.S.C. 396 a-f) governing the leasing of Tribal land. All bids shall be enclosed in an envelope addressed to the Superintendent and plainly marked "Bid for Oil and Gas Mining Leases" to be opened at 2:00 P.M., November 17, 1952. The list includes 160 acres of Tribal land and 29,995.95 acres of Allotted lands or a grand total of 30,155.95 acres of land. This list comprises 125 separate tracts of land each tract is considered as a separate bid. The lands are located in Dunn, Mountrail and McLean Counties, North Dakota. For further information such as a complete description of the lands offered, call or write the Superintendent of the Fort Berthold Agency, Elbowoods, North Dakota Dated October 17, 1952.

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LEGAL

U. S. DEPARTMENT OF THE INTERIOR, BUREAU OF LAND MANAGEMENT, Washington 25, D. C. Notice is hereby given that 18 parcels of land in Tps. 10 N., R. 58 E.; 8 N., R. 59 E.; 5, 6 and 7 N., R. 60 E.; and 5 and 6 N., R. 61 E., P.M., Montana, containing approximately 5,770.58 acres, within the known geologic structure of the Cedar Creek field, will be offered for oil and gas leasing through competitive bidding to the qualified bidder of the highest cash amount per acre at 1 p.m., Eastern Standard Time, November 19, 1952, when bids will be opened. Approximately 2,400 acres of the lands offered are subject to existing compensatory royalty agreements covering the natural gas deposits of the Judith River sand and are within areas of and subject to existing unit agreements. Special stipulations will be inserted in any leases issued for these lands. Details of the lease offering and the special stipulations and how and where to file bids may be obtained by addressing an inquiry to the Manager of the Land and Survey Office, Billings, Montana, or to this office. Marion Clawson, Director.

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AND NATIONAL

The entire facilities at National Tank are devoted to the development of products that save and conserve most for the user. This philosophy, combined with the extensive research and engineering staff, the completely modern seven-acre fabricating and assembly plant under one roof and the industry-wide distribution system, make National Tank "Standard of the Industry."

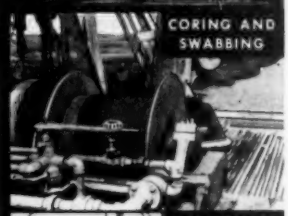
NATIONAL TANK COMPANY

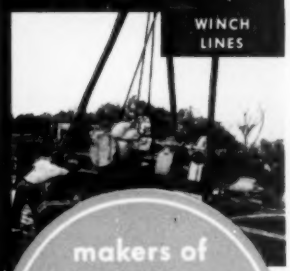
TULSA, OKLAHOMA

15-11-52

an ACCO product

for Every Oil Field Use





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***HUGHESET*—the bit that will drill more hole faster in hard, abrasive rock than any known tool!**

A product of Hughes research, the HUGHESET bit has proved itself in scores of West Texas, Oklahoma, Wyoming and Northern Louisiana wells.

In drilling tests in the laboratory (see above), using pink quartzite—four times harder to drill than granite—the HUGHESET bit drilled four times more hole than the previous best hard rock bit.

As seen in the photograph, the HUGHESET bit does not have conventional teeth. Sintered tungsten carbide and forged alloy steel are combined in a unique manner to produce the rugged construction and abrasion resistance of this bit.

Here's a bit that will outperform any other bit you have ever used in chert or hard, abrasive quartzitic formations. It drills faster... stays on bottom longer... and cuts down on those time-killing round trips.

Your local Hughes representative will be glad to advise you as to the conditions under which the HUGHESET bit can be run to best advantage.